Risk Evaluation for 1,4-Dioxane

Systematic Review Supplemental File:

Data Quality Evaluation of Environmental Releases and Occupational Exposure Data

CASRN: 123-91-1

June 2019
This document is a compilation of tables for the data extraction and evaluation for 1,4-Dioxane. Each table shows the data point or set or information element that was extracted and evaluated from a data source in accordance with Appendix D of the Application of Systematic Review in TSCA Risk Evaluations. If the source contains more than one data set or information element, the review provides an overall confidence score for each data set or information element that is found in the source. Therefore, it is possible that a source may have more than one overall quality/ confidence score.

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<tr>
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</tbody>
</table>

### Explanatory Notes

These explanatory notes provide context to understand the short comments in the data evaluation tables.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Description of Comments Field</th>
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<tbody>
<tr>
<td>Reliability</td>
<td>Methodology</td>
<td>Indicates the sampling/analytical methodology, estimation method, or type of publication</td>
</tr>
<tr>
<td>Representativeness</td>
<td>Geographic Scope</td>
<td>Indicates the country of the study, publication, or underlying data</td>
</tr>
<tr>
<td></td>
<td>Applicability</td>
<td>Indicates whether the data are for a condition of use within scope of the Risk Evaluation</td>
</tr>
<tr>
<td></td>
<td>Temporal Representativeness</td>
<td>Provides the year of study, publication, or underlying data</td>
</tr>
<tr>
<td></td>
<td>Sample Size</td>
<td>Describes the distribution of the sample or underlying data</td>
</tr>
<tr>
<td>Accessibility / Clarity</td>
<td>Metadata Completeness</td>
<td>Describes the completeness of the metadata</td>
</tr>
<tr>
<td>Variability and Uncertainty</td>
<td>Metadata Completeness</td>
<td>Indicates if study or publication addresses variability and uncertainty of the data or information</td>
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</table>
Releases to the Environment
Source Citation: Nicnas., 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7.
Type of Data Source: Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID: 3827412

<table>
<thead>
<tr>
<th><strong>EXTRACTION</strong></th>
<th><strong>Data</strong></th>
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</thead>
<tbody>
<tr>
<td>Parameter Data</td>
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<tr>
<td>Life Cycle Stage:</td>
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<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
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</tr>
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<tr>
<td>Waste Treatment Method:</td>
<td>Sewage Treatment Plant</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>EVALUATION</strong></th>
<th><strong>Metric</strong></th>
<th><strong>Rating</strong></th>
<th><strong>MWF</strong></th>
<th><strong>Score</strong></th>
<th><strong>Comments</strong></th>
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</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
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<td>× 1</td>
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<td>Clear documentation of data sources, methods, results and assumptions</td>
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<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
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<td>× 1</td>
<td>2</td>
<td>Limited discussion of variability and uncertainty</td>
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<tr>
<td>Overall Quality Determination†</td>
<td>High</td>
<td>1.5</td>
<td></td>
<td></td>
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</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
### Source Citation
Nicnas., 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7.

### Type of Data Source
Releases to the Environment; Completed Exposure or Risk Assessments;

### Hero ID
3827412

### EXTRACTION

<table>
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<td>Release Days per Year:</td>
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<td>Number of Sites:</td>
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<tr>
<td>Waste Treatment Method:</td>
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### EVALUATION

<table>
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<th>Domain</th>
<th>Metric</th>
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<th>MWF*</th>
<th>Score</th>
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<td>× 1</td>
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<td>× 2</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
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<td>4</td>
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<td>× 1</td>
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<td>Clear documentation of data sources, methods, results and assumptions</td>
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<td>Metric 7: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Limited discussion of variability and uncertainty</td>
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</table>

### Overall Quality Determination‡
High 1.5

* MWF = Metric Weighting Factor
‡ If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: \( \geq 1 \) to \(< 1.7\); Medium: \( 1.7 \) to \(< 2.3\); Low: \( \geq 2.3 \) to \( \leq 3\).
<table>
<thead>
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<th>Nicnas., 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7.</th>
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<td>Type of Data Source</td>
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**EXTRACTION**

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<tr>
<td>Waste Treatment Method:</td>
<td>Sewage Treatment Plant</td>
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**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
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<th>Score</th>
<th>Comments</th>
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<td>× 1</td>
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<tr>
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<td>× 1</td>
<td>2</td>
<td>Australia</td>
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<td>Metric 7: Metadata Completeness</td>
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<td>× 1</td>
<td>2</td>
<td>Limited discussion of variability and uncertainty</td>
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</tbody>
</table>

**Overall Quality Determination†**

| | High | 1.5 |

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  High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
### Source Citation
Carex, Canada. 2017. Profiles & estimates: 1,4-Dioxane.

### Type of Data Source
Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;

### Hero ID
3978382

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#### EXTRACTION

<table>
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<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Basic chemical mfg</td>
</tr>
<tr>
<td>Annual Release Quantity (kg/yr):</td>
<td>5 tonnes</td>
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</table>

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#### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
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<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td><strong>Domain 1: Reliability</strong></td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>National Pollutant Release Inventory (NPRI)</td>
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<tr>
<td><strong>Domain 2: Representative</strong></td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
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<td>Canada</td>
</tr>
<tr>
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<td>Metric 3: Applicability</td>
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<td>× 2</td>
<td>2</td>
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</tr>
<tr>
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<td>× 2</td>
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<td>Metric 7: Metadata Completeness</td>
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<td>× 1</td>
<td>3</td>
<td>Does not address variability or uncertainty</td>
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</table>

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| Overall Quality Determination† | High | 1.4 |

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  - High: ≥ 1 to < 1.7
  - Medium: ≥ 1.7 to < 2.3
  - Low: ≥ 2.3 to ≤ 3.
**EXTRACTION**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Disposal</td>
</tr>
<tr>
<td>Release Source:</td>
<td>All industries</td>
</tr>
<tr>
<td>Disposal /Treatment Method:</td>
<td>Underground Injection Wells, Landfills, Air</td>
</tr>
<tr>
<td>Environmental Media:</td>
<td>Water, land, air</td>
</tr>
<tr>
<td>Release or Emission Factor:</td>
<td>RY2015 TRI releases, multiple release and disposal categories</td>
</tr>
<tr>
<td>Release Estimation Method:</td>
<td>Self-reported by industry for TRI</td>
</tr>
<tr>
<td>Annual Release Quantity (kg/yr):</td>
<td>1,291,650 lb/yr total on- and off-site disposal or other release</td>
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</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
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<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
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<tbody>
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<td>× 1</td>
<td>1</td>
<td>US EPA, TRI, ‘trusted source</td>
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<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
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<td>× 1</td>
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<td>US</td>
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<tr>
<td></td>
<td>Metric 5: Sample Size</td>
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<td>× 1</td>
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</table>

Overall Quality Determination†

| | High | 1.6 |

---

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<table>
<thead>
<tr>
<th>Parameter</th>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Processing, Use, Disposal</td>
</tr>
<tr>
<td>Release Source:</td>
<td>Multiple, see p. 37</td>
</tr>
<tr>
<td>Disposal /Treatment Method:</td>
<td>Incineration, energy recovery, fuel blending, WWT - tanks, POTW,</td>
</tr>
<tr>
<td></td>
<td>WWT, Unspecified disposal</td>
</tr>
<tr>
<td>Environmental Media:</td>
<td>Land, water, air</td>
</tr>
<tr>
<td>Release or Emission Factor:</td>
<td>Contains reported volumes and total loading by waste type (waste</td>
</tr>
<tr>
<td></td>
<td>waters, solids, organic waste)</td>
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<tr>
<td>Release Estimation Method:</td>
<td>Facility reporting, 1993 RCRA 3007 Questionaire</td>
</tr>
<tr>
<td>Annual Release Quantity (kg/yr):</td>
<td>207 million kg/yr, see p. 41 for breakdown by management practice</td>
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<td>Waste Treatment Method:</td>
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**EVALUATION**

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<tr>
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<td>1 US</td>
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<td>Metric 3: Applicability</td>
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<td>2 occupational scenario within the scope of the risk evaluation</td>
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<td>× 2</td>
<td>6 1993 RCRA 3007 Questionaire</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
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<td>× 1</td>
<td>3 Distribution of samples is qualitative or characterized by no</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>statistics</td>
</tr>
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<td>× 1</td>
<td>1 Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2 Limited discussion of variability and uncertainty</td>
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Continued on next page
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<table>
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<tr>
<th>Domain</th>
<th>Metric</th>
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<th>MWF*</th>
<th>Score</th>
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<tbody>
<tr>
<td>Overall Quality Determination†</td>
<td>Medium</td>
<td></td>
<td>1.8</td>
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</tbody>
</table>

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High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 

Source Citation: 1996. Solvents study.
Type of Data Source: Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID: 3860540

MWF = Metric Weighting Factor
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---
**Source Citation:** Dow Chemical, Company. 1989. Dow Chemical information submitted to EPA pursuant to section 8(e) of the Toxic Substances Contract Act (TSCA).

**Type of Data Source:** Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; Hero ID 3861185

### EXTRAcTIONS

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<tr>
<th>Parameter</th>
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<tbody>
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<tr>
<td>Release Source:</td>
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</tr>
<tr>
<td>Disposal /Treatment Method:</td>
<td>Aqueous waste stream</td>
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<tr>
<td>Environmental Media:</td>
<td>Water</td>
</tr>
<tr>
<td>Release or Emission Factor:</td>
<td>Not specified</td>
</tr>
<tr>
<td>Release Estimation Method:</td>
<td>Laboratory simulation and analysis</td>
</tr>
<tr>
<td>Waste Treatment Method:</td>
<td>Condensor, then transferred to solvent-waste separator; or organic vapors from degreasing operations may be treated by activated carbon adsorption</td>
</tr>
<tr>
<td>P2 Control &amp; percent Efficiency:</td>
<td>Reports removal efficiency of activated sludge stream and carbon adsorption, see p. 27</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
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<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Dow Chemical information request response</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1985</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Distribution of samples is qualitative or characterized by no statistics</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>includes most critical metadata</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>Does not address variability or uncertainty</td>
</tr>
</tbody>
</table>

Continued on next page
Source Citation: Dow Chemical, Company. 1989. Dow Chemical information submitted to EPA pursuant to section 8(e) of the Toxic Substances Contract Act (TSCA).

Type of Data Source: Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; Hero ID 3861185

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Quality Determination†</td>
<td></td>
<td>Medium</td>
<td>1.9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  - High: $\geq 1$ to $< 1.7$
  - Medium: $\geq 1.7$ to $< 2.3$
  - Low: $\geq 2.3$ to $\leq 3$.
**Source Citation:** 1995. OPPT chemical fact sheets: 1, 4-Dioxane fact sheet: Support document.  
**Type of Data Source:** Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;  
**Hero ID:** 3860496

### EXTRATION

<table>
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<th>Parameter</th>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, and use</td>
</tr>
<tr>
<td>Release Source:</td>
<td>TRI-reporting industries</td>
</tr>
<tr>
<td>Environmental Media:</td>
<td>Air, water, land</td>
</tr>
<tr>
<td>Release or Emission Factor:</td>
<td>1992 TRI - Total 1.13 million pounds released, 680 thousand pounds to atmosphere, 450 thousand pounds to surface waters, and 33 hundred pounds were released onto the land.</td>
</tr>
<tr>
<td>Release Estimation Method:</td>
<td>Self-reported by industry for TRI</td>
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### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US EPA OPPT Chemical Fact Sheet, trusted source</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1995 literature search</td>
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<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Limited discussion of variability and uncertainty</td>
</tr>
</tbody>
</table>

**Overall Quality Determination†:** Medium 1.7

* MWF = Metric Weighting Factor  
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
  High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
**Source Citation:** U.S. E. P. A.. 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane.

**Type of Data Source:** Releases to the Environment; Completed Exposure or Risk Assessments;

**Hero ID:** 3809027

### EXTRACTION

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, and use</td>
</tr>
<tr>
<td>Release Source:</td>
<td>Combined</td>
</tr>
<tr>
<td>Disposal /Treatment Method:</td>
<td>Incineration</td>
</tr>
<tr>
<td>Environmental Media:</td>
<td>Environmental releases of 1,4-dioxane to air and water may contribute to ecological and general population exposures. The potential for release of 1,4-dioxane to air is high due to the high vapor pressure of 1,4-dioxane and disposal through incineration. Industrial and commercial use of 1,4-dioxane and presence in consumer products suggest releases to water are possible</td>
</tr>
<tr>
<td>Release or Emission Factor:</td>
<td>Reports releases from TRI, notes generally decreasing total releases from 1988 to 2007</td>
</tr>
<tr>
<td>Release Estimation Method:</td>
<td>Self-reported by industry for TRI</td>
</tr>
<tr>
<td>Annual Release Quantity (kg/yr):</td>
<td>Multiple estimates from TRI, see document</td>
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<tr>
<td>Number of Sites:</td>
<td>39 to 45</td>
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### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>TSCA Work Plan Chemical</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Continued on next page</td>
</tr>
</tbody>
</table>
Source Citation: U.S. E. P. A.. 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane.
Type of Data Source: Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID: 3809027

<table>
<thead>
<tr>
<th>EVALUATION</th>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Metric 7: Metadata Completeness</td>
<td>High x 1</td>
<td>1</td>
<td></td>
<td></td>
<td>clear documentation of variability and uncertainty</td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td>High</td>
<td>1.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
Source Citation: Atsdr., 2012. Toxicological profile for 1,4-dioxane.
Type of Data Source: Releases to the Environment; Environmental Release Data;
Hero ID: 3982333

<table>
<thead>
<tr>
<th>EXTRACCIÓN</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, and use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All stages</td>
</tr>
<tr>
<td>Release Source:</td>
<td>TRI-reporting industries</td>
</tr>
<tr>
<td>Disposal /Treatment Method:</td>
<td>Incineration, POTW</td>
</tr>
<tr>
<td>Environmental Media:</td>
<td>Environmental releases of 1,4-dioxane to air and water may contribute to ecological and general population exposures. The potential for release of 1,4-dioxane to air is high due to the high vapor pressure of 1,4-dioxane and disposal through incineration. Industrial and commercial use of 1,4-dioxane and presence in consumer products suggest releases to water are possible</td>
</tr>
</tbody>
</table>

| EVALUATION |
|------------|------|
| Domain 1: Reliability | |
| Metric 1: Methodology | High | × 1 | 1 | ATSDR Toxicological Profile |

| Domain 2: Representative | |
| Metric 2: Geographic Scope | High | × 1 | 1 | US |
| Metric 3: Applicability | High | × 2 | 2 | Scenario within the scope of the risk evaluation |
| Metric 4: Temporal Representativeness | High | × 2 | 2 | 2012 |
| Metric 5: Sample Size | High | × 1 | 1 | TRI Sites |

| Domain 3: Accessibility/Clarity | |
| Metric 6: Metadata Completeness | Medium | × 1 | 2 | Includes media, life cycle stage, and annual releases |

| Domain 4: Variability and Uncertainty | |
| Continued on next page | |

Continued on next page
Source Citation: Atsdr., 2012. Toxicological profile for 1,4-dioxane.
Type of Data Source: Releases to the Environment; Environmental Release Data;
Hero ID: 3982333

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 7:</td>
<td>Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>States that TRI data isn’t 100 percent reliable since only certain sites are required to report.</td>
</tr>
</tbody>
</table>

Overall Quality Determination†

High 1.1

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

* MWF = Metric Weighting Factor
Source Citation: Nih., 2016. Report on carcinogens: 1,4-Dioxane.
Type of Data Source: Releases to the Environment; Environmental Release Data;
Hero ID: 3982327

<table>
<thead>
<tr>
<th>Parameter</th>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, and use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All stages</td>
</tr>
<tr>
<td>Release Source:</td>
<td>TRI-reporting industries</td>
</tr>
<tr>
<td>Environmental Media:</td>
<td>46 percent Air, 27 percent Surface Water, 26 percent underground injection</td>
</tr>
<tr>
<td>Release Estimation Method:</td>
<td>Self-reported by industry for TRI</td>
</tr>
<tr>
<td>Annual Release Quantity (kg/yr):</td>
<td>309,000 lb</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>53</td>
</tr>
</tbody>
</table>

**Evaluation**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Department of Health and Human Services NTP</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2016</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>TRI Sites</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Includes media and total releases</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>Does not address variability or uncertainty</td>
</tr>
</tbody>
</table>

Overall Quality Determination†

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Quality Determination†</td>
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<td>1.3</td>
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</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
### Source Citation:

### Type of Data Source
Releases to the Environment; Environmental Release Data;

### Hero ID
3579380

### EXTRATION

<table>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Disposal</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Disposal</td>
</tr>
<tr>
<td>Release Source:</td>
<td>Incineration, landfill leachate</td>
</tr>
<tr>
<td>Release or Emission Factor:</td>
<td>Up to 340 ug/L detected in leachate</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>2 landfills 3 incineration sites</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Research paper from Chemosphere</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Japan</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2008</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>38 samples from landfill sites</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Includes total leachate produced/day, emission factors for dioxane form samples</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>clear documentation of variability and uncertainty</td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td></td>
<td>High</td>
<td></td>
<td>1.1</td>
<td></td>
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</tbody>
</table>

*MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 
Source Citation: Chemistry Industry Association of, Canada. 2017. All substances emissions for 2012 and projections for 2015.
Type of Data Source: Releases to the Environment; Environmental Release Data;
Hero ID: 3982361

**EXTRACTION**

<table>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
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</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All stages</td>
</tr>
<tr>
<td>Annual Release Quantity (kg/yr):</td>
<td>4.8 tonnes in 2012 (Actual) 6 tonnes in 2015 (projected)</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>2</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Chemistry Industry Association of Canada</td>
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<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
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<td>× 1</td>
<td>2</td>
<td>Canada</td>
</tr>
<tr>
<td>Metric 3: Applicability</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>Unsure what scenario data is for</td>
<td></td>
</tr>
<tr>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2012</td>
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</tr>
<tr>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
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</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>Includes annual release for the two sites, but no other data</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>Does not address variability or uncertainty</td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td>Medium</td>
<td>2.1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
| Source Citation: | Chemistry Industry Association of, Canada. 2017. All substances emissions for 2011 and projections for 2014. |
| Type of Data Source: | Releases to the Environment; Environmental Release Data; |
| Hero ID: | 3982362 |

<table>
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<th>Parameter</th>
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<tbody>
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<td>Manufacturing, processing, and use</td>
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<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All stages</td>
</tr>
<tr>
<td>Annual Release Quantity (kg/yr):</td>
<td>7.25 tonnes in 2011 (actual)7.3 tonnes in 2014 (projected)</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>EVALUATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Domain 1: Reliability</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
</tr>
<tr>
<td>Metric 3: Applicability</td>
</tr>
<tr>
<td>Metric 4: Temporal Representativeness</td>
</tr>
<tr>
<td>Metric 5: Sample Size</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
</tr>
</tbody>
</table>

| Overall Quality Determination† | Medium | 2.1 |

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
## Source Citation

## Type of Data Source
Releases to the Environment; Environmental Release Data;

## Hero ID
3986456

### Parameter Data

| Life Cycle Stage: | Disposal |
| Life Cycle Description (Subcategory of Use): | Disposal |
| Release Source: | Runoff from leaking tanks, tank rinsate |
| Environmental Media: | Water |
| Release or Emission Factor: | 7.2 µg/L detected in sampling |

### EVALUATION

<table>
<thead>
<tr>
<th>Domain: Reliability</th>
<th>Metric: Methodology</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Florida DEP</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain: Representative</th>
<th>Metric: Geographic Scope</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain: Representative</th>
<th>Metric: Applicability</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenario within the scope of the risk evaluation</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain: Representative</th>
<th>Metric: Temporal Representativeness</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2011</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain: Representative</th>
<th>Metric: Sample Size</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Multiple wells sampled</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain: Accessibility/Clarity</th>
<th>Metric: Metadata Completeness</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 6: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Includes some sampling information, but not much information about the processes performed at the plant</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain: Variability and Uncertainty</th>
<th>Metric: Metadata Completeness</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>Does not address variability or uncertainty</td>
<td></td>
</tr>
</tbody>
</table>

**Overall Quality Determination**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Rating</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metadata Completeness</td>
<td>High</td>
<td>1.3</td>
</tr>
</tbody>
</table>

*MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, and use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All stages</td>
</tr>
<tr>
<td>Release Source:</td>
<td>2002 TRI Reporting industries</td>
</tr>
<tr>
<td>Environmental Media:</td>
<td>Water, air, land, off-site. Water is primary concern.</td>
</tr>
<tr>
<td>Annual Release Quantity (kg/yr):</td>
<td>1,146,641 lb/yr total (lists amounts for each media)</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>11 listed in table</td>
</tr>
<tr>
<td>Waste Treatment Method:</td>
<td>Advanced oxidation, bioremediation, adsorption (GAC)</td>
</tr>
<tr>
<td>P2 Control &amp; percent Efficiency:</td>
<td>Gives table with initial and final contaminant concentrations for different sites and technologies</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>EPA Office of Solid Waste and Emergency Response</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>2006</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>TRI Sites</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Includes media and total releases</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>States that TRI data isn’t 100 percent reliable since only certain sites are required to report.</td>
</tr>
</tbody>
</table>

Overall Quality Determination†

| High | 1.3 |

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  High: \( \geq 1 \) to \(< 1.7 \);
  Medium: \( 1.7 \) to \(< 2.3 \);
  Low: \( \geq 2.3 \) to \( \leq 3 \).
### Source Citation
Adeq., 2012. Tucson International Airport Area (TIAA) overview: EPA cercla site.

### Type of Data Source
Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;

### Hero ID
3982201

### Parameter Data
<table>
<thead>
<tr>
<th>Parameter</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Processing, and use</td>
</tr>
<tr>
<td>Waste Treatment Method:</td>
<td>Advanced Oxidation Treatment system, Granular activated carbon (GAC) to treat contaminated groundwater</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Arizona DEQ, EPA</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>Groundwater remediation activities (out of scope)</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2012</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A - No Sampling</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A - No Sampling</td>
</tr>
</tbody>
</table>

| Overall Quality Determination†  | Unacceptable                       | 4.0    | Metric Mean Score: 2.0. |

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

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Source Citation: Adeq,. 2017. National priorities list (NPL) sites (federal superfund): Tucson International Airport area (TIAA) overview.
Type of Data Source: Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID: 3982191

### EXTRATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Processing, and use</td>
</tr>
<tr>
<td>Waste Treatment Method:</td>
<td>Advanced Oxidation Treatment system, Granular activated carbon (GAC) to treat contaminated groundwater</td>
</tr>
</tbody>
</table>

### EVALUATION

#### Domain 1: Reliability

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Arizona DEQ, EPA</td>
</tr>
</tbody>
</table>

#### Domain 2: Representative

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td>Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>Groundwater remediation activities (out of scope)</td>
</tr>
<tr>
<td>Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2012</td>
</tr>
<tr>
<td>Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A - No Comment.</td>
<td></td>
</tr>
</tbody>
</table>

#### Domain 3: Accessibility/Clarity

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A - No Sampling</td>
<td></td>
</tr>
</tbody>
</table>

#### Domain 4: Variability and Uncertainty

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A - No Sampling</td>
<td></td>
</tr>
</tbody>
</table>

** Overall Quality Determination†**: Unacceptable 4.0 Metric Mean Score: 2.0.

---

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

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- High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
Source Citation: 2017. Pollution prevention search results, envirofacts database.
Type of Data Source: Releases to the Environment; Environmental Release Data;
Hero ID: 3860453

### EXTRATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Multiple Subcategories</td>
</tr>
<tr>
<td>Release Source:</td>
<td>NAICS code provided for each site</td>
</tr>
<tr>
<td>Disposal /Treatment Method:</td>
<td>Pollution prevention method listed for each site</td>
</tr>
<tr>
<td>Daily Release Quantity (kg/day):</td>
<td>Pollution prevention method listed for each site</td>
</tr>
<tr>
<td>Annual Release Quantity (kg/yr):</td>
<td>Lists current year and prior year releases</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>51 sites in the table with Dioxane releases</td>
</tr>
<tr>
<td>Waste Treatment Method:</td>
<td>Pollution prevention method listed for each site</td>
</tr>
<tr>
<td>P2 Control &amp; percent Efficiency:</td>
<td>Pollution prevention method listed for each site, shows decrease in emissions before and after</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>USEPA Envirofacts</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>TRI Sites</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Includes releases, NAICS, and P2/Efficiency</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>Does not address variability or uncertainty</td>
</tr>
</tbody>
</table>

Overall Quality Determination†: High

---

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  High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
<table>
<thead>
<tr>
<th>Source Citation:</th>
<th>Environment Canada, Health Canada. 2010. Screening assessment for the challenge 1,4-dioxane.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Data Source</td>
<td>Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;</td>
</tr>
<tr>
<td>Hero ID</td>
<td>3981144</td>
</tr>
</tbody>
</table>

**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Disposal</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Disposal</td>
</tr>
<tr>
<td>Release Source:</td>
<td>2006 TRI</td>
</tr>
<tr>
<td>Environmental Media:</td>
<td>air, water, underground injection</td>
</tr>
<tr>
<td>Annual Release Quantity (kg/yr):</td>
<td>56 tonnes air, 22 tonnes water, 64 tonnes UI</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Environment Canada/Health Canada</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2010</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>TRI Sites</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**

| High | 1.0 |

---

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
**Source Citation:** Environment Canada, Health Canada. 2010. Screening assessment for the challenge 1,4-dioxane.

**Type of Data Source:** Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;

**Hero ID:** 3981144

### EXTRATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Disposal</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Disposal</td>
</tr>
<tr>
<td>Release Source:</td>
<td>2006 NPRI Canada</td>
</tr>
<tr>
<td>Environmental Media:</td>
<td>air, water</td>
</tr>
<tr>
<td>Annual Release Quantity (kg/yr):</td>
<td>13,800 kg air, 6,500 kg water</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>$\times$ 1</td>
<td>1</td>
<td>Environment Canada/Health Canada</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>$\times$ 1</td>
<td>2</td>
<td>Canada</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>$\times$ 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>$\times$ 2</td>
<td>2</td>
<td>2010</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>$\times$ 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>$\times$ 1</td>
<td>1</td>
<td>clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**

<table>
<thead>
<tr>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
* High: $\geq 1$ to $< 1.7$; Medium: $1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 
<table>
<thead>
<tr>
<th>Source Citation:</th>
<th>Matienzo, L. V.. 1989. Staff report on development of treatment standards for non-RCRA solvent waste.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Data Source:</td>
<td>Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;</td>
</tr>
<tr>
<td>Hero ID</td>
<td>3982116</td>
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### EXTRATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Disposal</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Disposal</td>
</tr>
<tr>
<td>Waste Treatment Method:</td>
<td>Describes different treatment methods for non-wastewater streams based on solvent concentration in the stream</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>×1</td>
<td>1</td>
<td>California Department of Health Services</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>×1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>×2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>×2</td>
<td>6</td>
<td>1989</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>×1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>×1</td>
<td>1</td>
<td>Clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**

| High | 1.5 |

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 
Source Citation: Adeq. 2017. National priorities list (NPL) sites (federal superfund): Air Force plant 44 (AFP-44)/Raytheon project area.
Type of Data Source: Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID: 3982188

### EXTRATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td></td>
</tr>
<tr>
<td>Waste Treatment Method:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Advanced Oxidation Treatment system, Granular activated carbon (GAC) to treat contaminated groundwater</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Arizona DEQ. EPA</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>Groundwater remediation activities (out of scope)</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2012</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A - No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A - No Sampling</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A - No Sampling</td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td></td>
<td>Unacceptable</td>
<td></td>
<td>4.0</td>
<td>Metric Mean Score: 2.0.</td>
</tr>
</tbody>
</table>

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor
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Source Citation: U.S. E. P. A. 1978. OAQPS guideline series: Control of volatile organic emissions from manufacture of synthesized pharmaceutical products.

Type of Data Source: Releases to the Environment; Environmental Release Data;

Hero ID: 3970050

EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Industrial Use - Pharmaceuticals</td>
</tr>
<tr>
<td>Release Source:</td>
<td>Dryers, reactors, distillation units, storage and transfer, filters, extractors, centrifuges, crystallizers (first 4 majority of emissions)</td>
</tr>
<tr>
<td>Environmental Media:</td>
<td>Air, contract haul</td>
</tr>
<tr>
<td>Release Estimation Method:</td>
<td>Cites EPA 1977 emission factors/equations for releases from storage tanks. Also App B from process equipment.</td>
</tr>
<tr>
<td>Annual Release Quantity (kg/yr):</td>
<td>2 metric tons to air, 41 metric tons to contract haul</td>
</tr>
<tr>
<td>Emission estimates from reactors for 4 companies with different control tech in Table 3-1 (Mg/yr, not dioxane specific just VOCs). Other tables have emissions from other steps in process, but do not list dioxane.</td>
<td></td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>800 Pharmaceutical plants in the US and territories</td>
</tr>
<tr>
<td>P2 Control &amp; percent Efficiency:</td>
<td>Storage and transfer: vapor return lines, vent condensers, conservation vents, vent scrubbers, pressure tanks, carbon adsorbers, floating roofs. Everything else: Condensers, scrubbers, and carbon adsorbers. Methods for calculating efficiencies in Ch.4</td>
</tr>
</tbody>
</table>

EVALUATION

<table>
<thead>
<tr>
<th>Domain 1: Reliability</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>EPA OAQPS</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain 2: Representative</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
<td></td>
</tr>
<tr>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td></td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1978</td>
<td></td>
</tr>
<tr>
<td>Metric 5: Sample Size</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td></td>
<td>Some data from 26 sites. Some information is general to all sites</td>
</tr>
</tbody>
</table>

Domain 3: Accessibility/Clarity

Continued on next page
Source Citation: U.S. E. P. A.. 1978. OAQPS guideline series: Control of volatile organic emissions from manufacture of synthesized pharmaceutical products.

Type of Data Source: Releases to the Environment; Environmental Release Data;

Hero ID: 3970050

EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of variability and uncertainty - states generalizations are difficult since there is a lot of variability between plants and volumes of chemicals used</td>
</tr>
</tbody>
</table>

Overall Quality Determination†

|                 | High | 1.6 |

*MWF = Metric Weighting Factor
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High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
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<td>Hero ID</td>
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### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, and use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All stages</td>
</tr>
<tr>
<td>Annual Release Quantity (kg/yr):</td>
<td>1,092,862 lbs total in 1988</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>EPA, TRI</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>General overview of TRI, Gave a total release of dioxane for one year</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1992</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
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<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
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<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
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<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
</tbody>
</table>

**Overall Quality Determination**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>2.3</td>
<td></td>
</tr>
</tbody>
</table>

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† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
Source Citation: 1999. Revised Risk Assessment for the Air Characteristic Study Volume I Overview.
Type of Data Source: Releases to the Environment; Published Models for Exposures or Releases;
Hero ID: 1261630

### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Disposal</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Disposal</td>
</tr>
<tr>
<td>Release Source:</td>
<td>Waste management units, landfill</td>
</tr>
<tr>
<td>Release Estimation Method:</td>
<td>CHEMDAT8 Modeling</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>EPA, OSW</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Model for emissions from waste disposal</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>1999</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
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<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

| Overall Quality Determination† | High | 1.2 |

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  High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
<table>
<thead>
<tr>
<th>Source Citation:</th>
<th>Ecjrc., 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Data Source</td>
<td>Releases to the Environment; Completed Exposure or Risk Assessments;</td>
</tr>
<tr>
<td>Hero ID</td>
<td>196351</td>
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</table>

**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacture, Processing</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacture, Processing</td>
</tr>
<tr>
<td>Environmental Media:</td>
<td>air, water, incineration</td>
</tr>
<tr>
<td>Release or Emission Factor:</td>
<td>emission factors for different industries (Tables 3.2, 3.3, 3.5)</td>
</tr>
<tr>
<td>Release Estimation Method:</td>
<td>derived from US emissions factors, TRI and industry data</td>
</tr>
<tr>
<td>Daily Release Quantity (kg/day):</td>
<td>daily releases for different industries (Tables 3.2, 3.3, 3.5)</td>
</tr>
<tr>
<td>Release Days per Year:</td>
<td>days/year for different industries (Tables 3.2, 3.3, 3.5)</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>5</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>European Chemicals Bureau</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>EU</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>2002</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Some datasets are represented as ranges with averages and 90th percentile, some are just ranges. The report provides recommended final values, but it is unclear how they got them.</td>
</tr>
</tbody>
</table>

| Domain 3: Accessibility/Clarity | Metric 6: Metadata Completeness                 | Medium | × 1  | 2     | Some datasets are represented as ranges with averages and 90th percentile, some are just ranges. The report provides recommended final values, but it is unclear how they got them. |

| Domain 4: Variability and Uncertainty | Metric 7: Metadata Completeness                 | High   | × 1  | 1     | clear documentation of variability and uncertainty                      |

| Overall Quality Determination†      | High                                           | 1.6    |      |                                               |

Continued on next page
- continued from previous page

<table>
<thead>
<tr>
<th>Source Citation:</th>
<th>Ecjrc,. 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Data Source</td>
<td>Releases to the Environment; Completed Exposure or Risk Assessments;</td>
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<td>Hero ID</td>
<td>196351</td>
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**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
</table>

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  - High: $\geq 1$ to $< 1.7$
  - Medium: $\geq 1.7$ to $< 2.3$
  - Low: $\geq 2.3$ to $\leq 3$. 

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**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, and use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All stages</td>
</tr>
<tr>
<td>Disposal /Treatment Method:</td>
<td>incineration, UI, waste broker</td>
</tr>
<tr>
<td>Environmental Media:</td>
<td>water, air, land</td>
</tr>
<tr>
<td>Annual Release Quantity (kg/yr):</td>
<td>87,166 lb/y to air19,134 to surface water1,035,300 to UI and waste broker</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>41</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>2015 PF (US EPA)</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>clear documentation of variability and uncertainty</td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td>High</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: $\geq 1$ to $< 1.7$; Medium: $1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 

**Source Citation:** Aca., 2015. Re: TSCA Work Plan Chemical Problem Formulation and Initial Assessment for 1,4-Dioxane.
**Type of Data Source:** Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data; **Hero ID:** 3809105
**Source Citation:** 2017. Pollution prevention search results, envirofacts database.

**Type of Data Source** Releases to the Environment; Environmental Release Data; Hero ID 3860453

## EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Processing, Use, Disposal</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Processing, Use, Disposal</td>
</tr>
<tr>
<td>Annual Release Quantity (kg/yr):</td>
<td>Total releases for specific facilities, shows previous year and percent reduction.</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>51</td>
</tr>
<tr>
<td>P2 Control &amp; percent Efficiency:</td>
<td>List pollution prevention info and percent reduction between 2 years</td>
</tr>
</tbody>
</table>

## EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>EnviroFacts</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2009-2015</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
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<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Provides total release and some P2 information.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>Just lists data.</td>
</tr>
</tbody>
</table>

Overall Quality Determination† High 1.4

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 

**Type of Data Source:** Releases to the Environment; Environmental Release Data;

**Hero ID:** 3982118

### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Disposal</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Disposal</td>
</tr>
<tr>
<td>Annual Release Quantity (kg/yr):</td>
<td>1,092,862 lb/yr</td>
</tr>
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### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>EPA, TRI</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>Unsure what scenario data is for</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>Provides total release for two years</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>Just lists data.</td>
</tr>
</tbody>
</table>

**Overall Quality Determination**

| Low | 2.5 |

---

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:

- **High:** $\geq 1$ to $< 1.7$
- **Medium:** $\geq 1.7$ to $< 2.3$
- **Low:** $\geq 2.3$ to $\leq 3.$
<table>
<thead>
<tr>
<th>Source Citation:</th>
<th>U.S. E. P. A.. 2017. Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal: 1,4-Dioxane.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Data Source:</td>
<td>Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;</td>
</tr>
<tr>
<td>Hero ID:</td>
<td>3986663</td>
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</table>

### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacturing, processing, use</td>
</tr>
<tr>
<td>Annual Release Quantity (kg/yr):</td>
<td>4,224,670 lbs</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>25 mfg0 import13 proc21 other uses (2015 TRI)</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>EPA Use Dossier</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
<td></td>
</tr>
<tr>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2017</td>
<td></td>
</tr>
<tr>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Lists data sources</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Limited discussion of variability and uncertainty</td>
</tr>
</tbody>
</table>

Overall Quality Determination†

| High | 1.1 |

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
Source Citation: N. C. State University. 2017. Identification and reduction of pollution sources in textile wet processing.
Type of Data Source: Releases to the Environment; Environmental Release Data;
Hero ID: 3986892

**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Industrial Use - Textiles</td>
</tr>
<tr>
<td>Release or Emission Factor:</td>
<td>0.65 lb/hr</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Department of Textile ChemistrySchool of TextilesNorth Carolina State University</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1986</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

Overall Quality Determination†

| High | 1.6 |

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Type of Data Source: Releases to the Environment; Published Models for Exposures or Releases;

Hero ID: 3827393

<table>
<thead>
<tr>
<th>EXTRATION Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Use</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EVALUATION Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>USGS, USDOL, EPA</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>More for fate modeling than releases. Use is for waste-oil refinery (out of scope)</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>2002</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

| Overall Quality Determination†      | Unacceptable                    | 4.0    | Metric Mean Score: 2.0. |

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
   High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Type of Data Source</td>
<td>Releases to the Environment; Environmental Release Data;</td>
</tr>
<tr>
<td>Hero ID</td>
<td>3970140</td>
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**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Disposal</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Military waste (out of scope)</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>EPA</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>Release data for military waste (food waste, standard waste, etc). Most dioxane samples non-detect</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2016</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>8 tests, multiple waste types</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

**Overall Quality Determination**

Unacceptable 4.0 Metric Mean Score: 1.7.

**Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.**

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:

  - High: ≥ 1 to < 1.7
  - Medium: ≥ 1.7 to < 2.3
  - Low: ≥ 2.3 to ≤ 3.
### Source Citation

### Type of Data Source
Releases to the Environment; Completed Exposure or Risk Assessments;

### Hero ID
3970671

#### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, Processing</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacturing, processing</td>
</tr>
<tr>
<td>Release or Emission Factor:</td>
<td>Summary of release information from 2002 EU Risk Assessment (HERO ID: 196351)</td>
</tr>
</tbody>
</table>

#### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>$\times$ 1</td>
<td>1</td>
<td>European Chemicals Bureau</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>$\times$ 1</td>
<td>2</td>
<td>EU</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>$\times$ 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>$\times$ 2</td>
<td>4</td>
<td>2002</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>$\times$ 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>$\times$ 1</td>
<td>1</td>
<td>clear documentation of variability and uncertainty</td>
</tr>
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</table>

#### Overall Quality Determination
High 1.4

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  - High: $\geq 1$ to $< 1.7$;
  - Medium: $\geq 1.7$ to $< 2.3$;
  - Low: $\geq 2.3$ to $\leq 3$. 

Type of Data Source: Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;

Hero ID: 3982214

### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Disposal</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>uncertain</td>
</tr>
<tr>
<td>Disposal /Treatment Method:</td>
<td>landfill</td>
</tr>
<tr>
<td>Release or Emission Factor:</td>
<td>more than 3.2 ug/L present in onsite extraction wells</td>
</tr>
<tr>
<td>P2 Control &amp; percent Efficiency:</td>
<td>need to put in new treatment system that can treat dioxane</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>EPA</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>Disposal, but missing a lot of useful information</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2016</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
</tbody>
</table>

Overall Quality Determination†: High 1.3

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
   High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Data Source</td>
<td>Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;</td>
</tr>
<tr>
<td>Hero ID</td>
<td>3982213</td>
</tr>
<tr>
<td><strong>EXTRACTION</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Parameter</strong></td>
<td><strong>Data</strong></td>
</tr>
<tr>
<td>Life Cycle Stage:</td>
<td>Disposal</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Disposal</td>
</tr>
<tr>
<td>Release Source:</td>
<td>Drum Recycling, then a depository for roofing shingles and construction debris</td>
</tr>
<tr>
<td>Release or Emission Factor:</td>
<td>Up to 390 ug/L in area monitoring wells</td>
</tr>
<tr>
<td><strong>EVALUATION</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Domain</strong></td>
<td><strong>Metric</strong></td>
</tr>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
</tr>
<tr>
<td><strong>Overall Quality Determination</strong>†</td>
<td>Unacceptable</td>
</tr>
</tbody>
</table>

**Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.**

* **MWF** = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
### Source Citation:

### Type of Data Source:
Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;

### Hero ID:
3982112

### Extraction

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Textiles</td>
</tr>
</tbody>
</table>

### Evaluation

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NCDENR</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>Releases related to 1,1,1-TCA, out of scope</td>
</tr>
<tr>
<td></td>
<td>Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1995</td>
</tr>
<tr>
<td></td>
<td>Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
</tbody>
</table>

### Overall Quality Determination†
Unacceptable   4.0   Metric Mean Score: 2.7.

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
Source Citation: U.S. E. P. A.. 1995. 1995 Toxics release inventory public data release overview.  
Type of Data Source: Releases to the Environment; Environmental Release Data;  
Hero ID: 3982106

**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, and use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All stages</td>
</tr>
<tr>
<td>Release or Emission Factor:</td>
<td>TRI releases from 1995</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>EPA</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>TRI data include occupational scenarios within scope, although data not broken down by sites or industries.</td>
</tr>
<tr>
<td></td>
<td>Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1995</td>
</tr>
<tr>
<td></td>
<td>Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>TRI Sites</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>TRI data only include release media; no other metadata included.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**  
Medium 1.7

---

* MWF = Metric Weighting Factor  
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High: $\geq 1 \text{ to } < 1.7$; Medium: $1.7 \text{ to } < 2.3$; Low: $\geq 2.3 \text{ to } \leq 3$.  

---

48
**Source Citation:** Sherry, S., Belliveau, M., Donegan, D., Gianolini, K., Sivas, D. 1985. High tech and toxics: A guide for local communities. Release to the Environment; Reports for Data or Information Other than Exposure or Release Data; Hero ID 3982107

<table>
<thead>
<tr>
<th>EXTRATION Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Disposal</td>
</tr>
<tr>
<td>Release Source:</td>
<td>BASF facility in Bedford, MA</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Methodology</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Golden Empire Health Planning Center</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>Does not provide engineering information. More relevant for community exposures</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1985</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Sample Size</td>
<td>N/A</td>
<td></td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td>Metadata Completeness</td>
<td>N/A</td>
<td></td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**: Unacceptable 4.0 Metric Mean Score: 2.8.

**Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:

High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
**Source Citation:** U.S. E. P. A.. 1993. Categories of released chemicals reported to the Toxic Release Inventory: 1990 data.
**Type of Data Source:** Releases to the Environment; Environmental Release Data;
**Hero ID:** 3982108

### EXTRACTION

<table>
<thead>
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<th>Parameter</th>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, and use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All stages</td>
</tr>
<tr>
<td>Release or Emission Factor:</td>
<td>TRI releases from 1990</td>
</tr>
</tbody>
</table>

### EVALUATION

**Domain 1: Reliability**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>EPA</td>
</tr>
</tbody>
</table>

**Domain 2: Representative**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>TRI data include occupational scenarios within scope.</td>
</tr>
<tr>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1990</td>
</tr>
<tr>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>TRI Sites</td>
</tr>
</tbody>
</table>

**Domain 3: Accessibility/Clarity**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 6: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>TRI data only include release media; no other metadata included.</td>
</tr>
</tbody>
</table>

**Domain 4: Variability and Uncertainty**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**

| Medium | 1.7 |

---

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  High: $\geq 1 \text{ to } < 1.7$; Medium: $\geq 1.7 \text{ to } < 2.3$; Low: $\geq 2.3 \text{ to } \leq 3$. 
Source Citation: Sapphire, Group. 2007. Voluntary Children’s Chemical Evaluation Program [VCCEP]. Tiers 1, 2, and 3 Pilot Submission For 1,4-Dioxane.
Type of Data Source: Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID: 3809038

### Extraction

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, and use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All stages</td>
</tr>
<tr>
<td>Release or Emission Factor:</td>
<td>233,349 lb. was released directly to the environment (38.4 percent to water, 49.3 percent to air and 12.4 percent to land)</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>51</td>
</tr>
</tbody>
</table>

### Evaluation

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Ferro Corp submission for VCCEP</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>TRI data include occupational scenarios within scope, although data not broken down by sites or industries.</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>2007</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>TRI Sites</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>TRI data only include release media; no other metadata included.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

Overall Quality Determination†: High 1.6

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
Occupational Exposure
### EXTRATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacture</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacture of Dioxane</td>
</tr>
<tr>
<td>Physical Form:</td>
<td>Liquid</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>1,000 - 2,000 ppm, 200 - 300 ppm</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>4</td>
</tr>
<tr>
<td>Number of Workers:</td>
<td>2,500 in the US exposed (not including 1,1,1-trichloroethane mfg)</td>
</tr>
<tr>
<td>Exposure Duration:</td>
<td>3-5 min, 15 min</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NIOSH report</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>occupational scenario within the scope of the risk evaluation - &quot;exposure data&quot; is from toxicology studies, not worker exposure during manufacture</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1977</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized</td>
</tr>
</tbody>
</table>

**Overall Quality Determination**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>1.8</td>
<td></td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:

High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 
**Source Citation:** Nicnas., 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7.

**Type of Data Source:** Occupational Exposure; Completed Exposure or Risk Assessments;

**Hero ID:** 3827412

### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Commercial Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Lab use</td>
</tr>
<tr>
<td>Physical Form:</td>
<td>Not specified</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>1.8 ppm (highest)</td>
</tr>
<tr>
<td>Type of Measurement or Method:</td>
<td>TWA</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>solvent extraction and TLC</td>
</tr>
<tr>
<td>Type of Sampling:</td>
<td>personal monitoring</td>
</tr>
<tr>
<td>Engineering Control &amp; percent Exposure Reduction:</td>
<td>film cupboards/hoods, dilution ventilation</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NICNAS</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Australia</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>1998</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A. Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Limited discussion of variability and uncertainty</td>
</tr>
</tbody>
</table>

| Overall Quality Determination†      | High                                       | 1.5    |      |       |                                                                           |

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
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**Source Citation:** Nicnas., 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7.

**Type of Data Source:** Occupational Exposure; Completed Exposure or Risk Assessments;

**Hero ID:** 3827412

### EXTRATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Commercial, potential consumer use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Film Cement</td>
</tr>
<tr>
<td>Physical Form:</td>
<td>Not specified</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>&lt;1ppm</td>
</tr>
<tr>
<td>Type of Measurement or Method:</td>
<td>pbz</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>Film cement application</td>
</tr>
<tr>
<td>PPE:</td>
<td>No PPE used</td>
</tr>
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</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NICNAS</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Australia</td>
</tr>
<tr>
<td></td>
<td>Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>1998</td>
</tr>
<tr>
<td></td>
<td>Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A. Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Limited discussion of variability and uncertainty</td>
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</tbody>
</table>

**Overall Quality Determination†**

|                | High | 1.5 |

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 
Source Citation: ToxNet Hazardous Substances Data, Bank. 2017. HSDB: 1,4-Dioxane.
Type of Data Source: Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID: 3970270

### EXTRACION

<table>
<thead>
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</thead>
<tbody>
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<td>Life Cycle Stage:</td>
<td>Industrial Use</td>
</tr>
<tr>
<td>Physical Form:</td>
<td>Not specified</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation, dermal</td>
</tr>
<tr>
<td>Number of Workers:</td>
<td>50-99 per plant/429,330 in the US</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>2012 TSCA IUR Data (per plant data), NIOSH NOES (Total worker data)</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Industrial Use</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>NIOSH NOES from 1981-1983</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>2012 TSCA IUR Data (per plant data), NIOSH NOES (Total worker data)</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>No discussion/not applicable</td>
</tr>
</tbody>
</table>

| Overall Quality Determination†   | Medium                       | 1.8    |

* MWF = Metric Weighting Factor
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High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
### Source Citation

### Type of Data Source
Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;

### Hero ID
3978118

### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter Description</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Industrial Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Textile processing; Wood pulping; Histology; Scintillation</td>
</tr>
<tr>
<td>Physical Form:</td>
<td>Not specified</td>
</tr>
<tr>
<td>Engineering Control &amp; percent Exposure Reduction:</td>
<td>Textile processing, Wood pulping: Local exhaust ventilation, general dilution ventilationHistology: local exhaust ventilationScintillation: General dilution ventilation</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
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<td>1</td>
<td>NIOSH and OSHA</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
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<td>1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>2</td>
<td>2</td>
<td>Wetting and dispersing agent in textiles, wood pulping, preparation of histological samples, and liquid scintillation medium</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>2</td>
<td>6</td>
<td>1978</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
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<td>N/A</td>
<td>N/A</td>
<td>N/A - no sampling data</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
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<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
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<td>1</td>
<td>3</td>
<td>No discussion/not applicable</td>
</tr>
</tbody>
</table>

Overall Quality Determination†: Medium 1.8

---

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  High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
### Source Citation
Carex, Canada. 2017. Profiles & estimates: 1,4-Dioxane.

### Type of Data Source
Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;

### Hero ID
3978382

### EXTRACTION
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Industrial Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Packaging final products</td>
</tr>
<tr>
<td>Physical Form:</td>
<td>Not specified</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation</td>
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<tr>
<td>Exposure Concentration (Unit):</td>
<td>40 mg/m³</td>
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<tr>
<td>Type of Measurement or Method:</td>
<td>European Model</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>Mixing and bagging final products</td>
</tr>
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<td>Number of Workers:</td>
<td>3,600 Canadians exposed in the workplace</td>
</tr>
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### EVALUATION

#### Domain 1: Reliability

<table>
<thead>
<tr>
<th>Metric 1: Methodology</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td></td>
<td>CAREX Canada</td>
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#### Domain 2: Representative

<table>
<thead>
<tr>
<th>Metric 2: Geographic Scope</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td></td>
<td>Canada</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Metric 3: Applicability</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td></td>
<td>Industrial Use</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Metric 4: Temporal Representativeness</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Metric 5: Sample Size</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A - no sampling data</td>
<td></td>
</tr>
</tbody>
</table>

#### Domain 3: Accessibility/Clarity

<table>
<thead>
<tr>
<th>Metric 6: Metadata Completeness</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td></td>
<td>Mentions a “European occupational exposure assessment” for the models, but doesn’t specify the assessment or the models</td>
</tr>
</tbody>
</table>

#### Domain 4: Variability and Uncertainty

<table>
<thead>
<tr>
<th>Metric 7: Metadata Completeness</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td></td>
<td>No discussion/not applicable</td>
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</tbody>
</table>

#### Overall Quality Determination†

<table>
<thead>
<tr>
<th>Metadata Completeness</th>
<th>Rating</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td></td>
<td>1.5</td>
</tr>
</tbody>
</table>

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---

58
**Source Citation:** Carex, Canada. 2017. 1,4-Dioxane– Occupational Estimate.

**Type of Data Source:** Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;

**Hero ID:** 3978383

### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Industrial Use</td>
</tr>
<tr>
<td>Physical Form:</td>
<td>Not specified</td>
</tr>
<tr>
<td>Number of Workers:</td>
<td>Basic Chem MFG - 200</td>
</tr>
<tr>
<td></td>
<td>Plastic product MFG - 200</td>
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</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domain 1: Reliability</strong></td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>CAREX Canada</td>
</tr>
<tr>
<td><strong>Domain 2: Representative</strong></td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Canada</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Industrial Use</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2017</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A - no sampling data</td>
</tr>
<tr>
<td><strong>Domain 3: Accessibility/Clarity</strong></td>
<td>Metric 6: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Assessment or report clearly documents results, methods, and assumptions. Data sources are generally described but not fully transparent.</td>
</tr>
<tr>
<td><strong>Domain 4: Variability and Uncertainty</strong></td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>The assessment does not address variability or uncertainty.</td>
</tr>
</tbody>
</table>

### Overall Quality Determination†

<table>
<thead>
<tr>
<th>Metric</th>
<th>Level</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>High</td>
<td>1.5</td>
</tr>
</tbody>
</table>

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High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Data Source</td>
<td>Occupational Exposure; Monitoring Data;</td>
</tr>
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<td>Hero ID</td>
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<td></td>
</tr>
<tr>
<td><strong>Parameter</strong></td>
<td><strong>Data</strong></td>
</tr>
<tr>
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<td>Physical Form:</td>
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<tr>
<td>Route of Exposure:</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>&lt; 25 ppm (estimation)</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>Describes exposure to three groups - 1) control operators who monitor operations in open-air plant from enclosed room, also take samples; 2) loading operators (to tank cars); 3) maintenance personnel who repair equipment</td>
</tr>
<tr>
<td>Number of Workers:</td>
<td>100</td>
</tr>
<tr>
<td><strong>EVALUATION</strong></td>
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</tr>
<tr>
<td><strong>Domain</strong></td>
<td><strong>Metric</strong></td>
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<tr>
<td>Domain 1: Reliability</td>
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<td>Metric 2: Geographic Scope</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
</tr>
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<td></td>
<td>Metric 4: Temporal Representativeness</td>
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<tr>
<td></td>
<td>Metric 5: Sample Size</td>
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<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
</tr>
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<td>Overall Quality Determination†</td>
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</tbody>
</table>

Continued on next page
### Source Citation

### Type of Data Source
Occupational Exposure; Monitoring Data;

### Hero ID
62914

## EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
</tr>
</thead>
</table>

*MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:

- High: $\geq 1$ to $< 1.7$;
- Medium: $\geq 1.7$ to $< 2.3$;
- Low: $\geq 2.3$ to $\leq 3$. 

---

61

Type of Data Source: Occupational Exposure; Monitoring Data; Hero ID: 62914

### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Processing</td>
</tr>
<tr>
<td>Physical Form:</td>
<td>Not specified</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>&lt; 25 ppm (estimation)</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>Dioxane processing subunit within vinyl-chloride vinylidene department</td>
</tr>
<tr>
<td>Number of Workers:</td>
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</tr>
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### EVALUATION

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<tr>
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<th>MWF*</th>
<th>Score</th>
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<td>Journal of Occupational Medicine, trusted source</td>
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<tr>
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<td>Metric 2: Geographic Scope</td>
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<td>×1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>×2</td>
<td>2</td>
<td>direct occupational scenario</td>
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<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
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<td>×2</td>
<td>6</td>
<td>1978</td>
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<tr>
<td></td>
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<td>Full characterization</td>
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<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
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<td>×1</td>
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<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>×1</td>
<td>1</td>
<td>clearly documented</td>
</tr>
</tbody>
</table>

Overall Quality Determination†

| Overall                     | High | 1.4 |

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
**Source Citation:** Jezewska, A., Szewczyńska, M., Woźniak, A. 2014. [Occupational exposure to airborne chemical substances in paintings conservators]. Medycyna Pracy.

**Type of Data Source:** Occupational Exposure; Monitoring Data; Hero ID 2539080

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<thead>
<tr>
<th><strong>EXTRACTION</strong></th>
<th><strong>Data</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Painting Studio</td>
</tr>
<tr>
<td>Physical Form:</td>
<td>Vapor</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>110 to 1,055 mg/m3 depending on activity</td>
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<td>Number of Samples:</td>
<td>5</td>
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<td>Number of Sites:</td>
<td>2</td>
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<tr>
<td>Type of Measurement or Method:</td>
<td>GC-FID</td>
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<tr>
<td>Worker Activity:</td>
<td>cleaning of the frame, cleaning of image</td>
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<tr>
<td>Type of Sampling:</td>
<td>Sampling tube, methods listed</td>
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<table>
<thead>
<tr>
<th><strong>EVALUATION</strong></th>
<th><strong>Domain</strong></th>
<th><strong>Metric</strong></th>
<th><strong>Rating</strong></th>
<th><em><em>MWF</em> Score</em>*</th>
<th><strong>Comments</strong></th>
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<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>Medium</td>
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<td>OECD source. OECD nations expected to use acceptable methods.</td>
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<td>2</td>
<td>OECD, Poland</td>
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<tr>
<td></td>
<td>Metric 3: Applicability</td>
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<td>× 2</td>
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<td>Out of scope</td>
</tr>
<tr>
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<td>Metric 4: Temporal Representativeness</td>
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<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>Low</td>
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<td>Unclear - most of paper is not in English</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Unacceptable</td>
<td>× 1</td>
<td>4</td>
<td>Most of paper is not in English; therefore, needed metadata are not provided.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>Unclear - most of paper is not in English</td>
</tr>
</tbody>
</table>

Continued on next page
Source Citation: Jezewska, A., Szewczyńska, M., Woźniak, A. 2014. [Occupational exposure to airborne chemical substances in paintings conservators]. Medycyna Pracy.

Type of Data Source: Occupational Exposure; Monitoring Data;

Hero ID: 2539080

<table>
<thead>
<tr>
<th>EVALUATION</th>
<th>Domain</th>
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<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
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<tbody>
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<td>Overall Quality</td>
<td>Determination†</td>
<td>Unacceptable</td>
<td></td>
<td>4.0</td>
<td></td>
<td>Metric Mean Score: 2.7.</td>
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** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, two of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:

High: \( \geq 1 \) to \( < 1.7 \); Medium: \( \geq 1.7 \) to \( < 2.3 \); Low: \( \geq 2.3 \) to \( \leq 3 \).
<table>
<thead>
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<th>Source Citation:</th>
<th>2017. Chemical data reporting: 1,4-Dioxane.</th>
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<tr>
<td>Type of Data Source</td>
<td>Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;</td>
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<td>Hero ID</td>
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### EXTRATION

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<th>Parameter</th>
<th>Data</th>
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<tr>
<td>Life Cycle Stage:</td>
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<tr>
<td>Physical Form:</td>
<td>liquid</td>
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<tr>
<td>Number of Sites:</td>
<td>1</td>
</tr>
<tr>
<td>Number of Workers:</td>
<td>50 to 99</td>
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### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
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<td>$\times$ 1</td>
<td>1</td>
<td>US EPA CDR, trusted source</td>
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<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>$\times$ 1</td>
<td>1</td>
<td>US</td>
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<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>$\times$ 2</td>
<td>2</td>
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<tr>
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<td>$\times$ 2</td>
<td>2</td>
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<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>Medium</td>
<td>$\times$ 1</td>
<td>2</td>
<td>Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Low</td>
<td>$\times$ 1</td>
<td>3</td>
<td>CDR Site data - underlying methods, sources, assumptions not transparent</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>$\times$ 1</td>
<td>3</td>
<td>No discussion/not applicable</td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**

| High | 1.6 |

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65
<table>
<thead>
<tr>
<th>Source Citation:</th>
<th>U.S. E. P. A. 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane.</th>
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</thead>
<tbody>
<tr>
<td>Type of Data Source</td>
<td>Occupational Exposure; Completed Exposure or Risk Assessments;</td>
</tr>
<tr>
<td>Hero ID</td>
<td>3809027</td>
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### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Physical Form:</td>
<td>Vapor</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>TWA: typical - 0.2 mg/m3; worst case 10 mg/m3</td>
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<tr>
<td>Type of Measurement or Method:</td>
<td>TWA</td>
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### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
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<td>Metric 2: Geographic Scope</td>
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<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>Medium</td>
<td>× 1</td>
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<td>Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.</td>
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<tr>
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<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
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<td>× 1</td>
<td>1</td>
<td>clearly documented - this data point exists within a range (see other data from this source)</td>
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</table>

### Overall Quality Determination

| High | 1.1 |

* MWF = Metric Weighting Factor
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### Source Citation
U.S. E. P. A.. 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane.

### Type of Data Source
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### Hero ID
3809027

### EXTRATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Processing</td>
</tr>
<tr>
<td>Physical Form:</td>
<td>Vapor</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>TWA: typical - 40 mg/m³; worst case 180 mg/m³</td>
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<td>Type of Measurement or Method:</td>
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### EVALUATION

<table>
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<tr>
<th>Domain</th>
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<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
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<tbody>
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<td>Metric 2: Geographic Scope</td>
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<td>occupational scenario within the scope of the risk evaluation</td>
</tr>
<tr>
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<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
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<td>2</td>
<td>Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
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<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
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<td>Metric 7: Metadata Completeness</td>
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<td>clearly documented - this data point exists within a range (see other data from this source)</td>
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</table>

### Overall Quality Determination†
High 1.1

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---

67
### Source Citation
U.S. E. P. A.. 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane.

### Type of Data Source
Occupational Exposure; Completed Exposure or Risk Assessments;

### Hero ID
3809027

### EXTRATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Cleaning agent</td>
</tr>
<tr>
<td>Physical Form:</td>
<td>Vapor</td>
</tr>
<tr>
<td>Route of Exposure:</td>
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</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>TWA: typical - 15 mg/m3; worst case 50 mg/m3</td>
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<tr>
<td>Type of Measurement or Method:</td>
<td>TWA</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
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<tbody>
<tr>
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<td>Metric 2: Geographic Scope</td>
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<td>× 1</td>
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<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
</tr>
<tr>
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<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2015</td>
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<td>2</td>
<td>Distribution of samples is characterized by a range with uncer-</td>
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<td></td>
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<td>tain statistics. It is unclear if analysis is representative.</td>
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<td></td>
<td>Metric 6: Metadata Completeness</td>
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<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and as-</td>
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<td></td>
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<td></td>
<td>other data from this source)</td>
</tr>
</tbody>
</table>

Overall Quality Determination†

| High                    | 1.1                                         |

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
<table>
<thead>
<tr>
<th>Source Citation</th>
<th>U.S. E. P. A.. 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane.</th>
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</thead>
<tbody>
<tr>
<td>Type of Data Source</td>
<td>Occupational Exposure; Completed Exposure or Risk Assessments;</td>
</tr>
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<td>Hero ID</td>
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<td>Life Cycle Description (Subcategory of Use):</td>
<td>Paint</td>
</tr>
<tr>
<td>Physical Form:</td>
<td>Vapor</td>
</tr>
<tr>
<td>Route of Exposure:</td>
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<tr>
<td>Exposure Concentration (Unit):</td>
<td>TWA: typical - 2 mg/m3; worst case 11 mg/m3</td>
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<tr>
<td>Type of Measurement or Method:</td>
<td>TWA</td>
</tr>
<tr>
<td><strong>EVALUATION</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Domain</strong></td>
<td><strong>Metric</strong></td>
</tr>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td>High</td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
**Source Citation:** U.S. E. P. A.. 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane.

**Type of Data Source**
Occupational Exposure; Completed Exposure or Risk Assessments;

**Hero ID**
3809027

### Parameter Data

| Life Cycle Stage: | Use |
| Life Cycle Description (Subcategory of Use): | Lab Solvent |
| Physical Form: | Vapor |
| Route of Exposure: | Inhalation |
| Exposure Concentration (Unit): | TWA: typical - 5 mg/m3; worst case 25 mg/m3 |
| Type of Measurement or Method: | TWA |

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>TSCA Work Plan Chemical</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
<td></td>
</tr>
<tr>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2015</td>
<td></td>
</tr>
<tr>
<td>Metric 5: Sample Size</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>clearly documented - this data point exists within a range (see other data from this source)</td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td>High</td>
<td>1.1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
### Source Citation

### Type of Data Source
Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;

### Hero ID
3970070

#### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Spray polyurethane foam</td>
</tr>
<tr>
<td>Physical Form:</td>
<td>Aerosol, Vapor, Dust</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation, dermal</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>&quot; During application &quot; After application &quot; During heat-generating pro-</td>
</tr>
<tr>
<td></td>
<td>cesses such as drilling, welding, or sanding &quot; During fires</td>
</tr>
<tr>
<td>Engineering Control &amp; percent Exposure Reduction:</td>
<td>- Ventilation and containment practices-Special procedures for permit re-</td>
</tr>
<tr>
<td></td>
<td>quired confined spaces</td>
</tr>
<tr>
<td>PPE:</td>
<td>- 2 Component HP: Supplied air respirator, eye protection, chemical resistant clothing and gloves- 2-Component LP: Air purifying respirator, eye protection, chemical resistant clothing and gloves- OCF: eye protection, chemical resistant clothing and gloves</td>
</tr>
</tbody>
</table>

#### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>EPA</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
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<td>× 2</td>
<td>2</td>
<td>2016</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>Document does not address variability or uncertainty</td>
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</tbody>
</table>

Continued on next page
– continued from previous page

<table>
<thead>
<tr>
<th>Source Citation:</th>
<th>U.S. E. P. A.. 2017. Information on the various spray polyurethane foam products.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Data Source</td>
<td>Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;</td>
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<td>Hero ID</td>
<td>3970070</td>
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**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Quality Determination†</td>
<td>High</td>
<td>1.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
   High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 


### Source Citation

### Type of Data Source
Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;

### Hero ID
3982104

### Extractions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Laboratory</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation, dermal</td>
</tr>
<tr>
<td>Engineering Control &amp; percent Exposure Reduction:</td>
<td>Recommended: Hood</td>
</tr>
<tr>
<td>PPE:</td>
<td>Recommended: Nitrile rubber for gloves and other materials</td>
</tr>
</tbody>
</table>

### Evaluation

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>National Research Council</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1981</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clearly documented</td>
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</tbody>
</table>

Overall Quality Determination†

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>1.5</td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  - High: $\geq 1$ to $< 1.7$; Medium: $1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 
<table>
<thead>
<tr>
<th>Parameter Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage: Manufacturing, processing, use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use): All life cycle stages</td>
</tr>
</tbody>
</table>

## EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>$\times 1$</td>
<td>1</td>
<td>California Environmental Protection Agency Office of Environmental Health</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>$\times 1$</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>$\times 2$</td>
<td>8</td>
<td>Doesn’t provide data applicable to risk assessment (primarily provides recommended exposure limits)</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>$\times 2$</td>
<td>4</td>
<td>2007</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>$\times 1$</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>$\times 1$</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
</tbody>
</table>

### Overall Quality Determination†

Unacceptable 4.0 Metric Mean Score: 2.0.

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:

  - High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 
**Source Citation:** Atsdr., 2009. Health consultation: Indoor air quality: Raytheon area: St. Petersburg, Pinellas County, Florida: EPA facility ID: FLD004100152, Part 2.

**Type of Data Source:** Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; Hero ID 3982212

**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Processing/use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Processing/use</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Florida Department of Health</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>Exposure data for general population. Didn’t end up sampling for 1,4-dioxane</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2009</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Full characterization</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**

Unacceptable 4.0 Metric Mean Score: 1.7.

**Notes:**

**Consistent with our Application of Systematic Review in TSCARisk Evaluations** document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

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High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
Source Citation: OSHA. 2004. Personal protective equipment.
Type of Data Source: Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID: 3978348

EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All life cycle stages</td>
</tr>
<tr>
<td>PPE:</td>
<td>General information about types of PPE use in industry. Not chemical or process-specific.</td>
</tr>
</tbody>
</table>

EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>OSHA</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Applicability</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>Very general description of recommendations for PPE in industry. Nothing specific to dioxane.</td>
</tr>
<tr>
<td></td>
<td>Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>2004</td>
</tr>
<tr>
<td></td>
<td>Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td></td>
<td>Medium</td>
<td>1.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: \( \geq 1 \) to \(< 1.7\); Medium: \( \geq 1.7 \) to \(< 2.3\); Low: \( \geq 2.3 \) to \(\leq 3\).
## Source Citation

## Type of Data Source
Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;

## Hero ID
3970050

## Extraction

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Industrial Use - Pharmaceuticals</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>800 Pharmaceutical plants in the US and territories</td>
</tr>
<tr>
<td>Number of Workers:</td>
<td>Usually &lt; 25 employees per site</td>
</tr>
</tbody>
</table>

## Evaluation

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
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<td>1</td>
<td>EPA OAQPS</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1978</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of variability and uncertainty - states generalizations are difficult since there is a lot of variability between plants and volumes of chemicals used</td>
</tr>
</tbody>
</table>

## Overall Quality Determination
High 1.5

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  - High: $\geq 1$ to $< 1.7$;
  - Medium: $\geq 1.7$ to $< 2.3$;
  - Low: $\geq 2.3$ to $\leq 3$. 
**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All life cycle stages</td>
</tr>
<tr>
<td>PPE:</td>
<td>Exposure assessed without taking into account influence of PPE. But, PPE is likely to reduce exposure by 85 percent for dermal and 90 percent for inhalation</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
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<td>× 1</td>
<td>1</td>
<td>European Chemicals Bureau</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>EU</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>2002</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Some datasets are presented as ranges with arithmetic averages and 90th percentile. Some are just presented as ranges with no additional data.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>clear documentation of variability and uncertainty</td>
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</table>

**Overall Quality Determination**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>Score</th>
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</thead>
<tbody>
<tr>
<td>Metadata Completeness</td>
<td>High</td>
<td>1.4</td>
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</table>

* MWF = Metric Weighting Factor
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  High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
Source Citation: Ecjrc. 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.
Type of Data Source: Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID: 196351

<table>
<thead>
<tr>
<th>Parameter</th>
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<tbody>
<tr>
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</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacture of Dioxane</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>Provides data from different tasks (storage, repair, syntheses, etc) (Table 4.1). Also estimates exposure using modeling.</td>
</tr>
<tr>
<td>Number of Samples:</td>
<td>5 sets of data, with n ranging from 1 to 305 for each set</td>
</tr>
<tr>
<td>Type of Measurement or Method:</td>
<td>EASE Model and sampling</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>Production, sampling, drumming, cleaning, and maintenance.</td>
</tr>
<tr>
<td>Type of Sampling:</td>
<td>area and personal sampling</td>
</tr>
<tr>
<td>Exposure Duration:</td>
<td>6-8 hr for full shift, 0-0.5 hr for short term</td>
</tr>
<tr>
<td>Exposure Frequency:</td>
<td>225 days/year</td>
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**EVALUATION**

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<th>Metric</th>
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<td>× 1</td>
<td>1</td>
<td>European Chemicals Bureau</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
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<td>× 1</td>
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<tr>
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<td>Metric 3: Applicability</td>
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<td>× 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
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<td>Metric 4: Temporal Representativeness</td>
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<td></td>
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<td>1</td>
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<tr>
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<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
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<td>Clear documentation of variability and uncertainty</td>
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<th>Score</th>
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<tbody>
<tr>
<td>Overall Quality Determination†</td>
<td>High</td>
<td>1.4</td>
<td></td>
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</table>

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Source Citation: Ecjrc., 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.  
Type of Data Source: Occupational Exposure; Completed Exposure or Risk Assessments;  
Hero ID: 196351

### EXTRATION

<table>
<thead>
<tr>
<th>Parameter</th>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
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<td>Life Cycle Description (Subcategory of Use):</td>
<td>Formulation of products containing 1,4-dioxane</td>
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<tr>
<td>Route of Exposure:</td>
<td>Inhalation and dermal</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>worst case inhalation: 180 mg/m3Typical inhalation: 40 mg/m3Dermal: 420 mg/m3</td>
</tr>
<tr>
<td>Number of Sites:</td>
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</tr>
<tr>
<td>Type of Measurement or Method:</td>
<td>EASE model</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>adding of the substance to a mixture, mixing and finally drumming or bagging of the product. In case of 1,4-dioxane the highest exposure probably occurs during adding of the substance and drumming of the product.</td>
</tr>
<tr>
<td>Exposure Duration:</td>
<td>6-8 hr for full shift</td>
</tr>
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<td>Exposure Frequency:</td>
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### EVALUATION

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<td>1</td>
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<td>Metric 2: Geographic Scope</td>
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<td>EU</td>
</tr>
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<td></td>
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<td>2</td>
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<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
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<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

Continued on next page
Source Citation: Ecjrc., 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.
Type of Data Source: Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID: 196351

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<tr>
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<th>Domain</th>
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<th>Rating</th>
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<th>Score</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Overall Quality Determination†</td>
<td>High</td>
<td>1.4</td>
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**Type of Data Source:** Occupational Exposure; Completed Exposure or Risk Assessments;

**Hero ID:** 196351

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<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
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<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>End use of 1,4-dioxane or the product containing 1,4-dioxane</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation and dermal</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>Exposure data available, estimates from modeling</td>
</tr>
<tr>
<td>Number of Samples:</td>
<td>5 data sets, n=1 to 305 for each</td>
</tr>
<tr>
<td>Type of Measurement or Method:</td>
<td>EASE and sampling</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>medicine mfg, pharmaceutical production, use as a solvent</td>
</tr>
<tr>
<td>Type of Sampling:</td>
<td>stationary and personal samples</td>
</tr>
<tr>
<td>Exposure Duration:</td>
<td>6-8 hr for full shift, 0-0.5 hr for short term</td>
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<tbody>
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<td>1</td>
<td>European Chemicals Bureau</td>
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<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
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<td>× 1</td>
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<td>EU</td>
</tr>
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<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
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<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
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<td>4</td>
<td>2002</td>
</tr>
<tr>
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<td>Metric 5: Sample Size</td>
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<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of variability and uncertainty</td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td></td>
<td>High</td>
<td></td>
<td>1.4</td>
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<table>
<thead>
<tr>
<th>Source Citation</th>
<th>Ecjrc., 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.</th>
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<tbody>
<tr>
<td>Type of Data Source</td>
<td>Occupational Exposure; Completed Exposure or Risk Assessments;</td>
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High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 
Source Citation: Aca., 2015. Re: TSCA Work Plan Chemical Problem Formulation and Initial Assessment for 1,4-Dioxane.
Type of Data Source: Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID: 3809105

<table>
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<th>Parameter</th>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All life cycle stages</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>summarizes exposure data from ECB 2002 (HERO ID 196351)</td>
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</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
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<th>Rating</th>
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</tr>
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<td>2015 PF (US EPA)</td>
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<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
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</tr>
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<td></td>
<td>Metric 3: Applicability</td>
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<td>x 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
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<td>High</td>
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<td>1</td>
<td>clear documentation of variability and uncertainty</td>
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</tbody>
</table>

Overall Quality Determination†

|                          | High | 1.0 |

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  High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
**Source Citation:** Cameo, Chemicals. 2016. Chemical datasheet: dioxane.

**Type of Data Source:** Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;

**Hero ID:** 3981005

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<table>
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<tr>
<th><strong>EXTRACTION</strong></th>
<th><strong>Data</strong></th>
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<tbody>
<tr>
<td>Parameter</td>
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<tr>
<td>PPE:</td>
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<tr>
<td>Generic PPE recommendations</td>
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<tr>
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<td><strong>Domain 1: Reliability</strong></td>
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<td>CAMEO Chemicals (NOAA)</td>
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<td><strong>Domain 2: Representative</strong></td>
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<td>US</td>
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<td>Metric 3: Applicability</td>
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<td>× 2</td>
<td>2</td>
<td>General information that likely applies to all scenarios</td>
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<td>No Comment.</td>
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</tr>
</tbody>
</table>

**Overall Quality Determination**<sup>†</sup> | High | 1.0 |

<sup>* MWF = Metric Weighting Factor</sup>  
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Type of Data Source: Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; Hero ID: 61633

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<td>1</td>
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</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>Primarily use as a stabilizer for TCE, which is out of scope. Mostly health information.</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1981</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
</tbody>
</table>

Overall Quality Determination†

| Unacceptable | 4.0 | Metric Mean Score: 2.7. |

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:

High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
**Source Citation:** Niosh, 1994. NIOSH pocket guide to chemical hazards.

**Type of Data Source:** Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;

**Hero ID:** 2328101

### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All life cycle stages</td>
</tr>
<tr>
<td>PPE:</td>
<td>Generic PPE recommendations</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NIOSH</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>General information that likely applies to all scenarios</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1994</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
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<td>N/A</td>
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<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td></td>
<td>Medium</td>
<td>1.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 
Source Citation: Kupczewska-Dobecka, M., Czerczak, S., Jakubowski, M., Maciaszek, P., Janasik, B. 2010. [Application of predictive model to estimate concentrations of chemical substances in the work environment]. Medycyna Pracy.

Type of Data Source: Occupational Exposure; Published Models for Exposures or Releases; Hero ID: 2583051

<table>
<thead>
<tr>
<th>Parameter</th>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All life cycle stages</td>
</tr>
<tr>
<td>Type of Measurement or Method:</td>
<td>Potentially information about EASE Model, but not in English</td>
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### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domain 1: Reliability</strong></td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>EASE Model, used by EU</td>
</tr>
<tr>
<td><strong>Domain 2: Representative</strong></td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>EU</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>Unknown - paper in different language, but likely applicable.</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
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<td>× 2</td>
<td>2</td>
<td>2010</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
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<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td><strong>Domain 3: Accessibility/Clarity</strong></td>
<td>Metric 6: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td><strong>Domain 4: Variability and Uncertainty</strong></td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td>Unacceptable</td>
<td>4.0</td>
<td>Metric Mean Score: 2.2.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics was rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
### Source Citation:

### Type of Data Source:
Occupational Exposure; Monitoring Data;

### Hero ID:
3859373

### EXTRATION

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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>MWF</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>0.14 to 0.23 mg/m³ (area)0.24 to 0.53 (PBZ)These are exposures to MWF, not dioxane specifically</td>
</tr>
<tr>
<td>Number of Samples:</td>
<td>6 PBZ, 4 area</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>Threader, broaching, Apex drill, lunch tables (for area)Transfer lines, roughing, four-way, multiple, screw machine-lathing, and apex drill (for pbz)</td>
</tr>
<tr>
<td>Type of Sampling:</td>
<td>area and personal sampling</td>
</tr>
<tr>
<td>Exposure Duration:</td>
<td>7 hours sample time</td>
</tr>
<tr>
<td>Analytic Method:</td>
<td>NIOSH Method 0500 - PVC filters at 2 L/min</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NIOSH HHE</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>Scenario is within the scope, but samples are for MWF, not Dioxane. Could possible still use data to estimate dioxane exposures from MWF use</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1997</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>workers sampled at the factory</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

Continued on next page
- continued from previous page

| Source Citation | Burton, N. C., Driscoll, R. J. 1997. Health hazard evaluation report no. HETA-95-0293-2655, Dana Corporation, Spicer Axle Division, Fort Wayne, Indiana. |
| Type of Data Source | Occupational Exposure; Monitoring Data; |
| Hero ID | 3859373 |

**EVALUATION**

<table>
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<tr>
<th>Domain</th>
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<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Overall Quality Determination†</td>
<td>Medium</td>
<td></td>
<td>1.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 
<table>
<thead>
<tr>
<th>EXTRATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parameter</strong></td>
<td><strong>Data</strong></td>
</tr>
<tr>
<td>Life Cycle Stage:</td>
<td>All stages</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All stages</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EVALUATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domain</strong></td>
<td><strong>Metric</strong></td>
</tr>
<tr>
<td><strong>Domain 1: Reliability</strong></td>
<td>Metric 1: Methodology</td>
</tr>
<tr>
<td><strong>Domain 2: Representative</strong></td>
<td>Metric 2: Geographic Scope</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
</tr>
<tr>
<td><strong>Domain 3: Accessibility/Clarity</strong></td>
<td>Metric 6: Metadata Completeness</td>
</tr>
<tr>
<td><strong>Domain 4: Variability and Uncertainty</strong></td>
<td>Metric 7: Metadata Completeness</td>
</tr>
</tbody>
</table>

**Overall Quality Determination\†** | Unacceptable | 4.0 | Metric Mean Score: 2.0. |

---

**Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.**

\* MWF = Metric Weighting Factor

\† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:

High: \( \geq 1 \) to \( < 1.7 \); Medium: \( \geq 1.7 \) to \( < 2.3 \); Low: \( \geq 2.3 \) to \( \leq 3 \).
**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>All stages</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All life cycle stages</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>Summary of exposure data from 2002 EU Risk Assessment (HERO ID: 196351)</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
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<td>$\times$ 1</td>
<td>1</td>
<td>European Chemicals Bureau</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Geographic Scope</td>
<td>Medium</td>
<td>$\times$ 1</td>
<td>2</td>
<td>EU</td>
</tr>
<tr>
<td></td>
<td>Applicability</td>
<td>High</td>
<td>$\times$ 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Temporal Representativeness</td>
<td>Medium</td>
<td>$\times$ 2</td>
<td>4</td>
<td>2002</td>
</tr>
<tr>
<td></td>
<td>Sample Size</td>
<td>Medium</td>
<td>$\times$ 1</td>
<td>2</td>
<td>Some datasets are presented as ranges with arithmetic averages and 90th percentile. Some are just presented as ranges with no additional data.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metadata Completeness</td>
<td>High</td>
<td>$\times$ 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metadata Completeness</td>
<td>High</td>
<td>$\times$ 1</td>
<td>1</td>
<td>clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

Overall Quality Determination$^\dagger$: High 1.4

$^* \text{MWF = Metric Weighting Factor}$

$^\dagger$ If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$.  

<table>
<thead>
<tr>
<th>Source Citation:</th>
<th>Echa, 2017. Uses by professional workers: 1,4-Dioxane.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Data Source</td>
<td>Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;</td>
</tr>
<tr>
<td>Hero ID</td>
<td>3970673</td>
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### EXTRACTION

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacturing, processing, use</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>List of generic uses and generic worker activities, but no data.</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
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<td>× 1</td>
<td>1</td>
<td>ECHA/REACH</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>EU</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>Generic use descriptions, no useful information</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>Unknown, but probably recent</td>
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<tr>
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<td>Metric 5: Sample Size</td>
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<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
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<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td>Unacceptable</td>
<td>4.0</td>
<td>Metric Mean Score: 2.5.</td>
<td></td>
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</tr>
</tbody>
</table>

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

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<table>
<thead>
<tr>
<th>Source Citation:</th>
<th>Iarc., 1999. IARC Monographs on the evaluation of carcinogenic risks to humans: 1,4-Dioxane.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Data Source</td>
<td>Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;</td>
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<tr>
<td>Hero ID</td>
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### EXTRACTION

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<th>Parameter</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>All stages</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All life cycle stages</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation, oral. Poor skin penetration</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>No data were available to the Working Group</td>
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</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>IARC</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>No exposure or release data. Lots of human health data</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>1999</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
</tbody>
</table>

** Overall Quality Determination**† | Unacceptable | 4.0 | Metric Mean Score: 2.3. |

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
Source Citation: Niosh., 2013. 1, 4-Dioxane.
Type of Data Source: Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID: 3978115

**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>All stages</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All stages</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NIOSH</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>Physical properties</td>
</tr>
<tr>
<td></td>
<td>Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>Unknown, but probably recently updated</td>
</tr>
<tr>
<td></td>
<td>Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
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</table>

**Overall Quality Determination†**

Unacceptable 4.0 Metric Mean Score: 2.3.

**Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

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† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
**Source Citation:** Niosh, Dioxane.  
**Type of Data Source:** Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;  
**Hero ID:** 3978116

### EXTRATION

<table>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
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<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All stages</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation, skin absorption, ingestion, skin and/or eye contact</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>$\times$ 1</td>
<td>1</td>
<td>NIOSH</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>$\times$ 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>$\times$ 2</td>
<td>8</td>
<td>Pocket guide, physical properties and health information</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>$\times$ 2</td>
<td>2</td>
<td>2016</td>
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<tr>
<td></td>
<td>Metric 5: Sample Size</td>
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<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
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<td>No Comment.</td>
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</table>

**Overall Quality Determination**†  
Unacceptable  
4.0  
Metric Mean Score: 2.0.

**Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.**

* MWF = Metric Weighting Factor  
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 

---

97
### Source Citation

### Type of Data Source
Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;

### Hero ID
3978117

### EXTRACTION

<table>
<thead>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
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<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All life cycle stages</td>
</tr>
<tr>
<td>Type of Measurement or Method:</td>
<td>NIOSH Method 1602</td>
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</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NIOSH</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>NIOSH method for sampling dioxane, but no exposure data</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1994</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment</td>
</tr>
</tbody>
</table>

#### Overall Quality Determination†
- Unacceptable: 4.0
- Metric Mean Score: 2.7.

** **Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

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† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  - High: $\geq 1$ to $< 1.7$;
  - Medium: $\geq 1.7$ to $< 2.3$;
  - Low: $\geq 2.3$ to $\leq 3$. 
<table>
<thead>
<tr>
<th>Source Citation:</th>
<th>Echa,. Links to registration dossiers.</th>
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<tbody>
<tr>
<td>Type of Data Source</td>
<td>Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;</td>
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<tr>
<td>Hero ID</td>
<td>4121210</td>
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**EXTRACTION**

<table>
<thead>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>All stages</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All life cycle stages</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>ECHA/REACH</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>EU</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>Generic worker descriptions, but not useful</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2017</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
</tbody>
</table>

**Overall Quality Determination**

**Unacceptable** 4.0 Metric Mean Score: 2.2.

**Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.**

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High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
Source Citation: Niosh. 2011. NIOSH manual of analytical methods: Formic acid.
Type of Data Source: Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID: 3986439

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>All stages</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All life cycle stages</td>
</tr>
<tr>
<td>Type of Measurement or Method:</td>
<td>NIOSH Method 2011 for Formic Acid</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NIOSH</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>NIOSH method for sampling formic acid. Uses dioxane as an optional reagent, but no exposure data</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1994</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
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<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
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<td>Metric 7: Metadata Completeness</td>
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<td></td>
<td>N/A</td>
<td>No Comment.</td>
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</tbody>
</table>

Overall Quality Determination†

Unacceptable 4.0 Metric Mean Score: 2.7.

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High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
### Source Citation

### Type of Data Source
Occupational Exposure; Monitoring Data;

### Hero ID
3986437

### EXTRACTION

<table>
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<th>Parameter</th>
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<td>Life Cycle Stage</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use)</td>
<td>Deepwater Horizon Response workers</td>
</tr>
<tr>
<td>Exposure Concentration (Unit)</td>
<td>all but one non-detect (0.2 ppb)</td>
</tr>
<tr>
<td>Number of Samples</td>
<td>17</td>
</tr>
<tr>
<td>Number of Sites</td>
<td>6 locations</td>
</tr>
<tr>
<td>Type of Measurement or Method</td>
<td>EPA TO-15 Summa; General Area sampling</td>
</tr>
<tr>
<td>Worker Activity</td>
<td>Various activities related to oil spill cleanup (dispersant operations and in-situ burning)</td>
</tr>
<tr>
<td>Exposure Duration</td>
<td>30-480 min</td>
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### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NIOSH</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>Out of scope</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2010</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Samples of various activities</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
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<td>No Comment.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
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<td>N/A</td>
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<td>No Comment.</td>
</tr>
</tbody>
</table>

| Overall Quality Determination † | Unacceptable                         | 4.0    |     |       | Metric Mean Score: 1.9.                       |

Continued on next page
**Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.**

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- High: $\geq 1$ to $< 1.7$
- Medium: $\geq 1.7$ to $< 2.3$
- Low: $\geq 2.3$ to $\leq 3$.
EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Printing</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>27 ppbv</td>
</tr>
<tr>
<td>Number of Samples:</td>
<td>1</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1</td>
</tr>
<tr>
<td>Type of Measurement or Method:</td>
<td>1.4-L TO-15 canister</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>placed directly adjacent to the 3-D printer, with a short (1 ft) piece</td>
</tr>
<tr>
<td></td>
<td>of Tygon tubing fixed to the inlet of the canister extending into the</td>
</tr>
<tr>
<td></td>
<td>3-D printer point of operation, underneath the hinged, unventilated</td>
</tr>
<tr>
<td></td>
<td>and interlocked guard.</td>
</tr>
<tr>
<td>Exposure Duration:</td>
<td>8 hours</td>
</tr>
<tr>
<td>Engineering Control &amp; percent Exposure Reduction:</td>
<td>Provide local exhaust ventilation system. Ventilation should be sufficient to effectively remove and prevent buildup of any dusts or fumes that may be generated during handling or thermal processing.</td>
</tr>
</tbody>
</table>

EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Study authors are qualified, sampling method well described, and authors used an accredited IH lab for analysis.</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>3D Printing</td>
</tr>
<tr>
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<td>Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2016</td>
</tr>
<tr>
<td></td>
<td>Sample Size</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>only one sample</td>
</tr>
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<td>Domain 3: Accessibility/Clarity</td>
<td>Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Describes sample point</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td></td>
<td></td>
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Continued on next page
Source Citation: T. Ryan, D. Hubbard. 2016. 3-D Printing Hazards: Literature Review & Preliminary Hazard Assessment.
Type of Data Source: Occupational Exposure; Monitoring Data; 5080530

<table>
<thead>
<tr>
<th>EVALUATION</th>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Metric 7:</td>
<td>Metadata Completeness</td>
<td>Medium</td>
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<td>2</td>
<td></td>
<td>Limited discussion of variability and uncertainty</td>
</tr>
</tbody>
</table>

Overall Quality Determination† High 1.2

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
### Source Citation


### Type of Data Source

Occupational Exposure; Monitoring Data;

### Hero ID

3986510

### Evaluation

<table>
<thead>
<tr>
<th>Parameter</th>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
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<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>unknown</td>
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<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>OSHA</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>Looks like it should be an excel file with exposure data, but it’s all smooshed together in a text file and not useful</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>unknown, but probably recent</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>CEHD</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**

Unacceptable 4.0 Metric Mean Score: 2.1.

**Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.**

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<table>
<thead>
<tr>
<th>Parameter</th>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>All stages</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All life cycle stages</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>OEHHA</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>Human Health, physical properties data</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>1999</td>
</tr>
<tr>
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<td>Metric 5: Sample Size</td>
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<td>× 1</td>
<td>1</td>
<td>CEHD</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
</tbody>
</table>

** Overall Quality Determination†**: Unacceptable 4.0 Metric Mean Score: 2.1.

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Type of Data Source: Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data; Hero ID: 3982114

EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
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<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Lubricant</td>
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</table>

EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>National Defense Center for Environmental Excellence</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Dry film lubricants for primarily aerospace applications</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>1998</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
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<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
</tbody>
</table>

Overall Quality Determination†

| High                          | 1.5                       |

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**Parameter** | **Data**
---|---
Life Cycle Stage: | Use
Life Cycle Description (Subcategory of Use): | car seat mfg

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NIOSH</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>Use not in scope, related to 1,1,1-TCA. Polyurethane foam, but not spray application</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1995</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>119 shift workers</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>qualitative assessment, not PBZ, Area samples, etc</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>qualitative assessment, not PBZ, Area samples, etc</td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**

| | Unacceptable | 4.0 | Metric Mean Score: 2.6. |

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Type of Data Source: Occupational Exposure; Monitoring Data; Hero ID: 3859374

### EXTRATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Vapor degreasing</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>1.5 to 13.3 ppm (pbz) 11.8 ppm (STEL) 2.5 to 51 ppm (Area)</td>
</tr>
<tr>
<td>Number of Samples:</td>
<td>21 pbz 12 area</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>various activities, tray cleaning</td>
</tr>
<tr>
<td>Exposure Duration:</td>
<td>full-shift 15-min</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>x 1</td>
<td>1</td>
<td>NIOSH</td>
</tr>
<tr>
<td></td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>x 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>x 2</td>
<td>8</td>
<td>Vapor degreasing with 1,1,1-TCE, not in scope</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>x 2</td>
<td>6</td>
<td>1995</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>x 1</td>
<td>1</td>
<td>21 pbz 12 area</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>x 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>x 1</td>
<td>1</td>
<td>clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

Overall Quality Determination†

| Unacceptable | 4.0 | Metric Mean Score: 2.1. |

Continued on next page
Type of Data Source: Occupational Exposure; Monitoring Data;
Hero ID: 3859374

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
</tr>
</thead>
</table>

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**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Touch-up paint</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>n.d. to 1.7 ppm (pbz)</td>
</tr>
<tr>
<td>Number of Samples:</td>
<td>17 pbz</td>
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<tr>
<td>Number of Sites:</td>
<td>1</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>various activities</td>
</tr>
<tr>
<td>Exposure Duration:</td>
<td>full-shift</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF* Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1 NIOSH</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1 US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8 not in scope</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6 1987</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>17 pbz</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>Clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

Overall Quality Determination‡   Unacceptable 4.0 Metric Mean Score: 2.1.
**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
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<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Type of Data Source:</td>
<td>Occupational Exposure; Monitoring Data;</td>
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<tr>
<td>Hero ID:</td>
<td>3859376</td>
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### EXTRATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
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</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>3 n.d.7 not analyzed for dioxane</td>
</tr>
<tr>
<td>Number of Samples:</td>
<td>10 area</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1</td>
</tr>
<tr>
<td>Type of Measurement or Method:</td>
<td>Gas Chromatography w/flame ionization</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF* Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1 NIOSH</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1 US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8 not in scope</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6 1981</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1 10 samples</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3 non-detects or not analyzed</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3 non-detects or not analyzed</td>
</tr>
</tbody>
</table>

| Overall Quality Determination† | Unacceptable | 4.0 | Metric Mean Score: 2.6. |

Continued on next page
Type of Data Source: Occupational Exposure; Monitoring Data;
Hero ID: 3859376

<table>
<thead>
<tr>
<th>EVALUATION</th>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
</table>

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### Source Citation

### Type of Data Source
Occupational Exposure; Monitoring Data;

### Hero ID
3859377

### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Silkscreening</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>n.d to 3.89 ppm (pbz)n.d. to 3.5 ppm (STEL)n.d. to 0.42 ppm (area)</td>
</tr>
<tr>
<td>Number of Samples:</td>
<td>34 pbz3 STEL24 area</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>various activities</td>
</tr>
<tr>
<td>Exposure Duration:</td>
<td>Full-shift</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NIOSH</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>not in scope</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1988</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>60 samples</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**
Unacceptable 4.0 Metric Mean Score: 2.1.

Continued on next page
**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Score Comments</strong></td>
<td><strong>Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  
High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 

Source Citation: Fidler, A. T., Crandall, M. S., Kerndt, P. R. 1988. Health hazard evaluation report no. HETA-86-051-1911, National Cover of Atlanta, Inc., Lawrenceville, Georgia.

Type of Data Source: Occupational Exposure; Monitoring Data;

Hero ID: 3859377
# Source Citation

# Type of Data Source
Occupational Exposure; Monitoring Data;

# Hero ID
3970466

## EXTRATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>1,1,1-TCE use in auto mfg</td>
</tr>
</tbody>
</table>

## EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>$\times$ 1</td>
<td>1</td>
<td>NIOSH</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>$\times$ 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>$\times$ 2</td>
<td>8</td>
<td>not in scope</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>$\times$ 2</td>
<td>6</td>
<td>1995</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A - No data for dioxane</td>
</tr>
</tbody>
</table>

| Domain 3: Accessibility/Clarity | Metric 6: Metadata Completeness | N/A | N/A | No Comment. |
| Domain 4: Variability and Uncertainty | Metric 7: Metadata Completeness | N/A | N/A | No Comment. |

**Overall Quality Determination**

- **Unacceptable**
- **Score:** 4.0
- **Metric Mean Score:** 2.7

**Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.**

**MWF = Metric Weighting Factor**

**If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:**

- **High:** $\geq 1$ to $< 1.7$; **Medium:** $\geq 1.7$ to $< 2.3$; **Low:** $\geq 2.3$ to $\leq 3$. 
Type of Data Source: Occupational Exposure; Monitoring Data;
Hero ID: 3974954

### Extraction

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>adhesive for paperwound packaging</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>7-14 ppm</td>
</tr>
<tr>
<td>Number of Samples:</td>
<td>22</td>
</tr>
<tr>
<td>Exposure Duration:</td>
<td>8-hr TWA</td>
</tr>
</tbody>
</table>

### Evaluation

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NIOSH</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>not in scope</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1987</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>22 samples</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**  
Unacceptable | 4.0 | Metric Mean Score: 2.1.

**Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.**

*MWF = Metric Weighting Factor
†If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.*
<table>
<thead>
<tr>
<th>Source Citation:</th>
<th>Atsdr., 2012. 1,4- Dioxane - ToxFAQs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Data Source</td>
<td>Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;</td>
</tr>
<tr>
<td>Hero ID</td>
<td>3978119</td>
</tr>
</tbody>
</table>

**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>General public exposures</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>$\times 1$</td>
<td>1</td>
<td>ToxFaqs</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>$\times 1$</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>$\times 2$</td>
<td>8</td>
<td>Consumer exposure information</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>$\times 2$</td>
<td>2</td>
<td>2012</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
</tbody>
</table>

**Overall Quality Determination**

| Unacceptable | 4.0 | Metric Mean Score: 2.0. |

**Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.**

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- Medium: $\geq 1.7$ to $< 2.3$;
- Low: $\geq 2.3$ to $\leq 3$. 

119
**Source Citation:** Niosh, 2014. International chemical safety cards (ICDC): 1, 4-dioxane.

**Type of Data Source:** Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;

**Hero ID:** 3978147

### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>All stages</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All life cycle stages</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation, dermal</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NIOSH</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>No engineering information.</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**: Unacceptable 4.0 Metric Mean Score: 2.0.

---

**Consistent with our Application of Systematic Review in TSCARisk Evaluations** document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

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† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
Source Citation: Sapphire, Group. 2007. Voluntary Children’s Chemical Evaluation Program [VCCEP]. Tiers 1, 2, and 3 Pilot Submission For 1,4-Dioxane.
Type of Data Source: Occupational Exposure; Completed Exposure or Risk Assessments; Hero ID: 3809038

### EXTRACTED PARAMETER DATA

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>All stages</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All life cycle stages</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>Table 6-1 (p.128) provides multiple datasets of PBZ sampling</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>52 companies (2004 TRI)</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>various activities</td>
</tr>
<tr>
<td>Number of Workers:</td>
<td>&lt;10,000</td>
</tr>
</tbody>
</table>

### EVALUATION

**Domain 1: Reliability**
- **Metric 1:** Methodology
  - Rating: Medium
  - MWF*: × 1
  - Score: 2
  - Comments: Ferro Corp submission for VCCEP

**Domain 2: Representative**
- **Metric 2:** Geographic Scope
  - Rating: High
  - MWF*: × 1
  - Score: 1
  - Comments: US
- **Metric 3:** Applicability
  - Rating: High
  - MWF*: × 2
  - Score: 2
  - Comments: In scope, many of the sources for pbz data are other HERO sources already extracted
- **Metric 4:** Temporal Representativeness
  - Rating: Medium
  - MWF*: × 2
  - Score: 4
  - Comments: 2007
- **Metric 5:** Sample Size
  - Rating: High
  - MWF*: × 1
  - Score: 1
  - Comments: Multiple

**Domain 3: Accessibility/Clarity**
- **Metric 6:** Metadata Completeness
  - Rating: High
  - MWF*: × 1
  - Score: 1
  - Comments: Clear documentation of data sources, methods, results and assumptions

**Domain 4: Variability and Uncertainty**
- **Metric 7:** Metadata Completeness
  - Rating: High
  - MWF*: × 1
  - Score: 1
  - Comments: clear documentation of variability and uncertainty

**Overall Quality Determination†**
- Rating: High
- Score: 1.3

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Type of Data Source: Occupational Exposure; Monitoring Data;
Hero ID: 1316845

### EXTRATION

<table>
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<tr>
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</tr>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Film Cement</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Film Cement</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>less than 1 ppm</td>
</tr>
<tr>
<td>Number of Samples:</td>
<td>4 pbz, 1 area</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>2</td>
</tr>
<tr>
<td>Type of Measurement or Method:</td>
<td>pbz, area</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>splicing</td>
</tr>
<tr>
<td>Number of Workers:</td>
<td>4</td>
</tr>
<tr>
<td>Type of Sampling:</td>
<td>pbz, area</td>
</tr>
<tr>
<td>Exposure Duration:</td>
<td>6 hr</td>
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</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NIOSH</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td>Domain</td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Film cement, film splicing</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1982</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>2 sites, 3 workers</td>
</tr>
</tbody>
</table>

Metric 6: Metadata Completeness
High × 1 1 Clear documentation of data sources, methods, results and assumptions

Metric 7: Metadata Completeness
High × 1 1 clear documentation of variability and uncertainty

Continued on next page

Type of Data Source: Occupational Exposure; Monitoring Data;

Hero ID: 1316845

<table>
<thead>
<tr>
<th>EVALUATION</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Quality Determination†</td>
<td>High</td>
<td>1.4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  - High: \( \geq 1 \) to \( < 1.7 \);
  - Medium: \( \geq 1.7 \) to \( < 2.3 \);
  - Low: \( \geq 2.3 \) to \( \leq 3 \).
**Source Citation:** BASF. 2016. Analytical Reports and Data Summaries from Worker Monitoring at the US Facility for 1,4-Dioxane Production.

**Type of Data Source:** Occupational Exposure; Monitoring Data;

**Hero ID:** 5079874

### EXTRACITION

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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>provided in report, most less than 2 ug/sample</td>
</tr>
<tr>
<td>Number of Samples:</td>
<td>28</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1</td>
</tr>
<tr>
<td>Type of Measurement or Method:</td>
<td>absorbant tubes, OVM badges</td>
</tr>
<tr>
<td>Exposure Duration:</td>
<td>lists time in minutes for each sample</td>
</tr>
<tr>
<td>Analytic Method:</td>
<td>NIOSH 1602</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>AIHA Accredited Laboratory for Industrial Hygiene, NIOSH 1602</td>
</tr>
<tr>
<td></td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Domestic Manufacture</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
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<td>× 2</td>
<td>4</td>
<td>up to 2011</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Representative sample size</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Provides method, supporting data</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Provides method, supporting data</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>some discussion of variability</td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>1.3</td>
</tr>
</tbody>
</table>

---

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 

124
Source Citation: BASF. 2017. Information in response to the "Preliminary information on manufacturing, processing, distribution, use, and disposal: 1,4-dioxane" document.
Type of Data Source: Occupational Exposure; Monitoring Data;
Hero ID: 3827415

<table>
<thead>
<tr>
<th>EXTRATION Parameter</th>
<th>Data</th>
</tr>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>0.39 ppm (15-min STEL) &lt; 0.056 ppm (8-hr TWA) 38 ppm (15-min STEL) 0.23 ppm (8-hr TWA)</td>
</tr>
<tr>
<td>Number of Samples:</td>
<td>4</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>Routine duties, neutralization, evaporator dump</td>
</tr>
<tr>
<td>Exposure Duration:</td>
<td>15 min STEL, 8 hr TWA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EVALUATION Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Monitoring by BASF*</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Domestic Manufacture</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2017</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>small sample size (4 points)</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>No discussion of methods, results, assumptions, etc.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>No discussion.</td>
</tr>
</tbody>
</table>

Overall Quality Determination†

| Medium | 1.7 |

* MWF = Metric Weighting Factor
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High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
Source Citation: J. Huber. 2018. Roofing: A Guide to the Options.
Type of Data Source: Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID: 5080509

<table>
<thead>
<tr>
<th>Parameter</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Spray polyurethane foam</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>a typical two-story, 2,300-square-foot house with a medium-pitch roof</td>
</tr>
<tr>
<td></td>
<td>has a roof area of about 1,500 squarefeet</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>General estimates for roofing. Data sources not specified.</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Spray Polyurethane Foam</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2018</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>No discussion of methods, results, assumptions, etc.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>No discussion.</td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td></td>
<td>Medium</td>
<td></td>
<td>1.8</td>
<td></td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
**Source Citation:** HomeAdvisor. 2018. How Much Do Asphalt Shingles & Roofs Cost To Install Or Replace?

**Type of Data Source:** Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;

**Hero ID:** 5080525

### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Spray polyurethane foam</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>an average size house is 1,500 square feet of roofing</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>Low</td>
<td>$\times 1$</td>
<td>3</td>
<td>General estimates for roofing. Data sources not specified.</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>$\times 1$</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>$\times 2$</td>
<td>2</td>
<td>Spray Polyurethane Foam</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>$\times 2$</td>
<td>2</td>
<td>2018</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Low</td>
<td>$\times 1$</td>
<td>3</td>
<td>No discussion of methods, results, assumptions, etc.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>$\times 1$</td>
<td>3</td>
<td>No discussion.</td>
</tr>
</tbody>
</table>

**Overall Quality Determination**\(^\dagger\)

| | Medium | 1.8 |

\(^*\) MWF = Metric Weighting Factor

\(^\dagger\) If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:

- High: $\geq 1$ to $< 1.7$
- Medium: $\geq 1.7$ to $< 2.3$
- Low: $\geq 2.3$ to $\leq 3$. 

127
### Source Citation

### Type of Data Source
Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;

### Hero ID
5080523

#### EXTRACTION

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Spray polyurethane foam</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>Mix A-side and B-side in 1:1 ratio</td>
</tr>
</tbody>
</table>

#### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Company Product Specification Sheet</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Spray Polyurethane Foam</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2018</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>No discussion of methods, results, assumptions, etc.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>No discussion.</td>
</tr>
</tbody>
</table>

### Overall Quality Determination
High

1.6

*MWF = Metric Weighting Factor
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High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
<table>
<thead>
<tr>
<th>Source Citation:</th>
<th>GAF. 2014. Safety Data Sheet: OlyBond Part B (Amber/Red).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Data Source</td>
<td>Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;</td>
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<td>Hero ID</td>
<td>5080527</td>
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**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Spray polyurethane foam</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>0.1 percent 1,4-dioxane in B-Side</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>SDS</td>
</tr>
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<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Spray Polyurethane Foam</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2014</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>No discussion of methods, results, assumptions, etc.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>No discussion.</td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**

| High | 1.5 |

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
Source Citation: M. Stites. 2018. [RE: Discussion Follow-up].
Type of Data Source: Occupational Exposure; Monitoring Data;
Hero ID: 5099258

**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Dry Film Lubrication</td>
</tr>
<tr>
<td>Physical Form:</td>
<td>liquid</td>
</tr>
<tr>
<td>Route of Exposure:</td>
<td>inhalation</td>
</tr>
<tr>
<td>Exposure Concentration (Unit):</td>
<td>&lt;0.031 to 50 ppm</td>
</tr>
<tr>
<td>Number of Samples:</td>
<td>25</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1</td>
</tr>
<tr>
<td>Type of Measurement or Method:</td>
<td>personal/area</td>
</tr>
<tr>
<td>Worker Activity:</td>
<td>Manufacture, Application - also provides specific activity descriptions</td>
</tr>
<tr>
<td>Type of Sampling:</td>
<td>personal/area</td>
</tr>
<tr>
<td>Exposure Duration:</td>
<td>varied</td>
</tr>
<tr>
<td>Engineering Control &amp; percent Exposure Reduction:</td>
<td>Local exhaust hood</td>
</tr>
<tr>
<td>PPE:</td>
<td>Tyvek lab coat, butyl gloves, &quot; face respirator with organic vapor cartridges, safety glasses with side shields, butyl gloves</td>
</tr>
<tr>
<td>Analytic Method:</td>
<td>NIOSH 1602/Direct Read (MiniRAE 2000)</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF* Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
</tr>
</tbody>
</table>

Continued on next page
Source Citation: M. Stites. 2018. [RE: Discussion Follow-up].
Type of Data Source: Occupational Exposure; Monitoring Data;
Hero ID: 5099258

<table>
<thead>
<tr>
<th>EVALUATION</th>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>Data do not inform variability in exposures</td>
</tr>
<tr>
<td></td>
<td>Overall Quality Determination†</td>
<td></td>
<td>High</td>
<td></td>
<td>1.4</td>
<td></td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
   High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 
**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Dry Film Lubrication</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>8</td>
</tr>
<tr>
<td>Number of Workers:</td>
<td>up to 10: Approximately 3-4 employees work in the chemical material area where the dry film lubricant is formulated. Another 5-6 employees work in the paint shop where the dry film lubricant is spray applied.</td>
</tr>
<tr>
<td>Type of Sampling:</td>
<td>8-hr TWA</td>
</tr>
<tr>
<td>Engineering Control &amp; percent Exposure Reduction:</td>
<td>Engineering controls (powered vented hoods) are employed which provide inhalation protection and dermal protection is provided by requiring chemical resistant gloves, safety glasses with side shields and lab apron when handling 1,4-Dioxane. Any exposure that might occur is well below regulatory action levels (reference previously provided personal and area monitoring data).</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Information provided by DoE/KCNSC</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Dry film lubricants</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2018</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
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<td></td>
<td>No Comment.</td>
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<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td>No Comment.</td>
</tr>
</tbody>
</table>

Continued on next page
Source Citation: M. Stites. 2018. [FW: 1,4-Dioxane].
Type of Data Source: Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID: 5099257

<table>
<thead>
<tr>
<th>EVALUATION</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Quality Determination†</td>
<td>High</td>
<td>1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: $\geq 1$ to $<1.7$; Medium: $\geq 1.7$ to $<2.3$; Low: $\geq 2.3$ to $\leq 3$. 
Facility
<table>
<thead>
<tr>
<th>Source Citation:</th>
<th>Niosh., 1977. Criteria for a recommended standard occupational exposure to dioxane.</th>
</tr>
</thead>
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<tr>
<td>Type of Data Source</td>
<td>Facility: Reports for Data or Information Other than Exposure or Release Data;</td>
</tr>
<tr>
<td>Hero ID</td>
<td>62937</td>
</tr>
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### Extractions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacture</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacture</td>
</tr>
<tr>
<td>Process Description:</td>
<td>Manufacture of dioxane via dehydrogenation of ethylene glycol</td>
</tr>
<tr>
<td>Total Annual U.S. Volume (and percent of PV):</td>
<td>10 million pounds (1 large)5 million pounds (1 large)1 million pounds (1 small)</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>2 large and 2 small facilities</td>
</tr>
<tr>
<td>Possible Physical Form:</td>
<td>Liquid</td>
</tr>
</tbody>
</table>

### Evaluation

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>$\times 1$</td>
<td>1</td>
<td>NIOSH report</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>$\times 1$</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>$\times 2$</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>$\times 2$</td>
<td>6</td>
<td>1977</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>$\times 1$</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>$\times 1$</td>
<td>1</td>
<td>clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

**Overall Quality Determination**

| High | 1.5 |

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 

---

PEER REVIEW DRAFT, DO NOT CITE OR QUOTE
### Source Citation
Nicnas., 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7.

### Type of Data Source
Facility: Completed Exposure or Risk Assessments;

### Hero ID
3827412

### EXTRAcTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Commercial Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Laboratory use</td>
</tr>
<tr>
<td>Total Annual U.S. Volume (and percent of PV):</td>
<td>500 kg</td>
</tr>
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</table>

### EVALUATION

#### Domain 1: Reliability

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NICNAS</td>
</tr>
</tbody>
</table>

#### Domain 2: Representative

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Australia</td>
</tr>
<tr>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>1998</td>
</tr>
<tr>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A. Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.</td>
</tr>
</tbody>
</table>

#### Domain 3: Accessibility/Clarity

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
</tbody>
</table>

#### Domain 4: Variability and Uncertainty

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 7: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Limited discussion of variability and uncertainty</td>
</tr>
</tbody>
</table>

### Overall Quality Determination†

<table>
<thead>
<tr>
<th>Rating</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>1.5</td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  High: \( \geq 1 \) to \(< 1.7\); Medium: \( \geq 1.7 \) to \(< 2.3\); Low: \( \geq 2.3 \) to \( \leq 3\).
**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Commercial, Potential Consumer Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Film Cement</td>
</tr>
<tr>
<td>Process Description:</td>
<td>Film is cut with special tool, the adhesive applied with a small brush (manually). Film joined and heated to 35 deg C to dry</td>
</tr>
<tr>
<td>Total Annual U.S. Volume (and percent of PV):</td>
<td>12 L (1 site)</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>Up to 10 film labs in Aus</td>
</tr>
<tr>
<td>Chemical Concentration:</td>
<td>10-50 percent</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NICNAS</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Australia</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>1998</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A. Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Limited discussion of variability and uncertainty</td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**

| High | 1.5 |

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High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
<table>
<thead>
<tr>
<th>Source Citation</th>
<th>Nicnas., 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Data Source</td>
<td>Facility; Completed Exposure or Risk Assessments;</td>
</tr>
<tr>
<td>Hero ID</td>
<td>3827412</td>
</tr>
</tbody>
</table>

### Extration

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Processing</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Pharmaceutical intermediate</td>
</tr>
<tr>
<td>Process Description:</td>
<td>Used in the reaction medium to produce pharmaceuticals</td>
</tr>
<tr>
<td>Total Annual U.S. Volume (and percent of PV):</td>
<td>100 kg</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1</td>
</tr>
</tbody>
</table>

### Evaluation

<table>
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<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>NICNAS</td>
</tr>
<tr>
<td>Domain 2: Representativet</td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Australia</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>1998</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A. Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Limited discussion of variability and uncertainty</td>
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</tbody>
</table>

**Overall Quality Determination**: High 1.5

*MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 
<table>
<thead>
<tr>
<th>Source Citation:</th>
<th>ToxNet Hazardous Substances Data, Bank. 2017. HSDB: 1,4-Dioxane.</th>
</tr>
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<tr>
<td>Type of Data Source</td>
<td>Facility; Reports for Data or Information Other than Exposure or Release Data;</td>
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<td>Hero ID</td>
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### EXTRACTION

<table>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacture</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacture of dioxane via dehydrogenation of ethylene glycol</td>
</tr>
<tr>
<td>Process Description:</td>
<td>Manufactured commercially by dehydration and ring closure of diethylene glycol. Concentrated sulfuric acid is catalyst. Continuous process, dioxane vaporized and passed through an acid trap and two distillation columns to remove water and purify.</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1</td>
</tr>
<tr>
<td>Chemical Concentration:</td>
<td>90 percent</td>
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</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Process Description: Ullman’s Encyclopedia of Industrial Chemistry Site: 2012 CDR</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Manufacturing</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2012</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
<td>N/A</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Cites sources clearly</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>No discussion/not applicable</td>
</tr>
</tbody>
</table>

| Overall Quality Determination† | High | 1.2 |

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
### Source Citation:

### Type of Data Source
Facility; Completed Exposure or Risk Assessments;

### Hero ID
3860540

### EXTRACATION Parameter Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Processing, Use, Disposal</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Multiple, see p. 37 for a breakdown of the 27 total sites</td>
</tr>
<tr>
<td>Process Description:</td>
<td>Multiple, see p. 37 and 28. Contains one or two-sentence descriptions of use of chemical within each industry</td>
</tr>
<tr>
<td>Total Annual U.S. Volume (and percent of PV):</td>
<td>101,577 kg/yr use for all 27 sites; contains breakdown of use by industry on p. 45</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>27, includes site locations</td>
</tr>
<tr>
<td>Site Daily Throughput:</td>
<td>Can be estimated based on total use and # of sites</td>
</tr>
<tr>
<td>Possible Physical Form:</td>
<td>liquid solvent</td>
</tr>
</tbody>
</table>

### EVALUATION Domain Metric Rating MWF

#### Domain 1: Reliability

| Metric 1: Methodology               | High   | × 1 | 1 | US EPA Solvents Study, trusted source |

#### Domain 2: Representative

| Metric 2: Geographic Scope          | High   | × 1 | 1 | US |
| Metric 3: Applicability             | High   | × 2 | 2 | occupational scenario within the scope of the risk evaluation |
| Metric 4: Temporal Representativeness | Low   | × 2 | 6 | 1993 RCRA 3007 Questionnaire |
| Metric 5: Sample Size               | Low    | × 1 | 3 | Distribution of samples is qualitative or characterized by no statistics |

#### Domain 3: Accessibility/Clarity

| Metric 6: Metadata Completeness      | High   | × 1 | 1 | Clear documentation of data sources, methods, results and assumptions |

#### Domain 4: Variability and Uncertainty

| Metric 7: Metadata Completeness      | Medium | × 1 | 2 | Limited discussion of variability and uncertainty |

### Overall Quality Determination†

| Medium | 1.8 |

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  High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
Source Citation: 2017. Chemical data reporting: 1,4-Dioxane.
Type of Data Source: Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID: 3860451

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, and use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacturing, use (non-incorporative activities), paints and coatings, laundry and dishwashing products</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1 (manufacturing); 25-99 (non-incorp use); unknown for other uses</td>
</tr>
<tr>
<td>Possible Physical Form:</td>
<td>liquid</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US EPA CDR, trusted source</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2017</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>CDR Site data - underlying methods, sources, assumptions not transparent</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Low</td>
<td>× 1</td>
<td>3</td>
<td>No discussion/not applicable</td>
</tr>
</tbody>
</table>

Overall Quality Determination†

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>1.6</td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 
Source Citation: 1995. OPPT chemical fact sheets: 1, 4-Dioxane fact sheet: Support document.
Type of Data Source: Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID: 3860496

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>manufacturing</td>
</tr>
<tr>
<td>Process Description:</td>
<td>contains information on various uses, see p. 2</td>
</tr>
<tr>
<td>Total Annual U.S. Volume (and percent of PV):</td>
<td>between 10,500,000 and 18,300,000 pounds (as of 1990)</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>3 (as of 1992)</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US EPA OPPT Chemical Fact Sheet, trusted source</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>1995 literature search</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Limited discussion of variability and uncertainty</td>
</tr>
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</table>

Overall Quality Determination†

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>× 1</td>
<td>1.7</td>
</tr>
</tbody>
</table>

*MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 

142
| Source Citation: | Anderson, R. H., Anderson, J. K., Bower, P. A. | Co-occurrence of 1,4-dioxane with trichloroethylene in chlorinated solvent groundwater plumes at US Air Force installations: Fact or fiction. Integrated Environmental Assessment and Management. |
| Type of Data Source | Facility: Completed Exposure or Risk Assessments; |
| Hero ID | 1065024 |

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
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<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US Air Force Engineering Dept, trusted source</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2012</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Discusses variability, but not uncertainty</td>
</tr>
</tbody>
</table>

Overall Quality Determination† | High | 1.2 |

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
<table>
<thead>
<tr>
<th>Source Citation:</th>
<th>U.S. E. P. A.. 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Data Source:</td>
<td>Facility: Completed Exposure or Risk Assessments;</td>
</tr>
<tr>
<td>Hero ID</td>
<td>3809027</td>
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</tbody>
</table>

### EXTRATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, and use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>entire life cycle</td>
</tr>
<tr>
<td>Process Description:</td>
<td>source contains description of manufacturing, processing, and multiple uses</td>
</tr>
<tr>
<td>Total Annual U.S. Volume (and percent of PV):</td>
<td>Between 1 and 10 million pounds annually (as of 2006)</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>Lists one manufacturing site (BASF), which also reports processing and use of chemical</td>
</tr>
<tr>
<td>Possible Physical Form:</td>
<td>liquid, vapor</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Methodology</td>
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<td>× 1</td>
<td>1</td>
<td>TSCA Work Plan Chemical</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>occupational scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td>Sample Size</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Discusses variability, but not uncertainty</td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td>High</td>
<td></td>
<td></td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>

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  - High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
<table>
<thead>
<tr>
<th>Source Citation:</th>
<th>Atsdr,. 2012. Toxicological profile for 1,4-dioxane.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Data Source:</td>
<td>Facility; Reports for Data or Information Other than Exposure or Release Data;</td>
</tr>
<tr>
<td>Hero ID:</td>
<td>3982333</td>
</tr>
</tbody>
</table>

### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Process Description:</td>
<td>Manufactured in a closed system by acid catalyzed conversion of diethylene glycol via dehydration and ring closure</td>
</tr>
<tr>
<td>Total Annual U.S. Volume (and percent of PV):</td>
<td>1-10 million lbs in 2002</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>2 sites (DOW in TX and Ferro Corp in LA)</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>ATSDR Toxicological Profile</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2012</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>TRI Sites</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Discusses variability, but not uncertainty</td>
</tr>
</tbody>
</table>

Overall Quality Determination†

| High | 1.1 |

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145
**Source Citation:** Atsdr., 2012. Toxicological profile for 1,4-dioxane.

**Type of Data Source** Facility: Reports for Data or Information Other than Exposure or Release Data;

**Hero ID** 3982333

---

### EXTRATION

**Parameter**

- **Life Cycle Stage:** Manufacturing, processing, and use
- **Life Cycle Description (Subcategory of Use):** entire life cycle
- **Number of Sites:** Source lists number of facilities by state that produce, process, or use Dioxane. Also identifies lifecycle stage. Based on TRI data from 2007

---

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domain 1: Reliability</strong></td>
<td><strong>Metric 1:</strong> Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>ATSDR Toxicological Profile</td>
</tr>
<tr>
<td><strong>Domain 2: Representative</strong></td>
<td><strong>Metric 2:</strong> Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td><strong>Metric 3:</strong> Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td><strong>Metric 4:</strong> Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2012</td>
</tr>
<tr>
<td></td>
<td><strong>Metric 5:</strong> Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>TRI Sites</td>
</tr>
<tr>
<td><strong>Domain 3: Accessibility/Clarity</strong></td>
<td><strong>Metric 6:</strong> Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td><strong>Domain 4: Variability and Uncertainty</strong></td>
<td><strong>Metric 7:</strong> Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Discusses variability, but not uncertainty</td>
</tr>
</tbody>
</table>

**Overall Quality Determination**

- **High**

---

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- High: ≥ 1 to < 1.7
- Medium: ≥ 1.7 to < 2.3
- Low: ≥ 2.3 to ≤ 3
Source Citation: Nih., 2016. Report on carcinogens: 1,4-Dioxane.
Type of Data Source: Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID: 3982327

<table>
<thead>
<tr>
<th>EXTRATION Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, and use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>entire life cycle</td>
</tr>
<tr>
<td>Total Annual U.S. Volume (and percent of PV):</td>
<td>1-10 million lbs between 1994 and 2006</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1 mfg, 26 US Suppliers (2009)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EVALUATION Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Department of Health and Human Services NTP</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2016</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
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<td>N/A</td>
<td>No Comment.</td>
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</tr>
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<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>clear documentation of variability and uncertainty</td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td>High</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
**Source Citation:** Ec. 2004. Recommendation from the Scientific Committee on Occupational Exposure Limits for 1,4-dioxane.

**Type of Data Source:** Facility; Reports for Data or Information Other than Exposure or Release Data;

**Hero ID:** 3827409

### EXTRAC TION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Process Description:</td>
<td>acid-catalysed conversion of diethylene glycol by ring closure in a closed system</td>
</tr>
<tr>
<td>Total Annual U.S. Volume (and percent of PV):</td>
<td>10,000 tonnes/yr (global)</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>European Commission Employment, Social Affairs and Inclusion</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Global mfg data (not just US mfg)</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenario within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
<td>Paper is from 2004, but global PV data is from 1995</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Global Data for all producers at the time</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>States that in general the global production is decreasing</td>
</tr>
</tbody>
</table>

**Overall Quality Determination‡**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric 7: Metadata Completeness</td>
<td>Medium</td>
</tr>
</tbody>
</table>

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- High: ≥ 1 to < 1.7
- Medium: ≥ 1.7 to < 2.3
- Low: ≥ 2.3 to ≤ 3.
### Source Citation:
Environment Canada, Health Canada. 2010. Screening assessment for the challenge 1,4-dioxane.

### Type of Data Source
Facility; Reports for Data or Information Other than Exposure or Release Data;

### Hero ID
3981144

### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
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<td>Manufacture, import, processing, use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>entire life cycle</td>
</tr>
<tr>
<td>Total Annual U.S. Volume (and percent of PV):</td>
<td>10,000-100,000 kg mfg10,000-100,000 kg import10,000-100,000 kg used</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Environment Canada/Health Canada</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Canada</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
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</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
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<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of variability and uncertainty</td>
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</table>

* Overall Quality Determination†

<table>
<thead>
<tr>
<th></th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>1.1</td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  - High: $\geq 1$ to $< 1.7$;
  - Medium: $1.7$ to $< 2.3$;
  - Low: $\geq 2.3$ to $\leq 3$. 
Source Citation: U.S. E. P. A.. 1978. OAQPS guideline series: Control of volatile organic emissions from manufacture of synthesized pharmaceutical products.
Type of Data Source: Facility; Reports for Data or Information Other than Exposure or Release Data; Hero ID 3970050

**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Industrial Use - Pharmaceuticals</td>
</tr>
<tr>
<td>Process Description:</td>
<td>Series of batch operations: reaction(s), product separation, purification, and drying. Gives info on equipment used on page 2-1 and Ch 3, PFD Figure 2-1</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>800 Pharmaceutical plants in the US and territories</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>×1</td>
<td>1</td>
<td>EPA OAQPS</td>
</tr>
<tr>
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<td>Metric 2: Geographic Scope</td>
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<td>×1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>×2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
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<tr>
<td></td>
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<td>Low</td>
<td>×2</td>
<td>6</td>
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<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>×1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>×1</td>
<td>1</td>
<td>clear documentation of variability and uncertainty - states generalizations are difficult since there is a lot of variability between plants and volumes of chemicals used</td>
</tr>
</tbody>
</table>

| Overall Quality Determination†              | High                           | 1.5    |      |       |                                                    |

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High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
**Source Citation:** Ecjrc, 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.

**Type of Data Source:** Facility; Completed Exposure or Risk Assessments;

**Hero ID:** 196351

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### EXTRATION

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
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</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Process Description:</td>
<td>dehydration and ring closure of diethylene glycol. Process temperature varies from 130-200°C, under atmospheric pressure. The process is continuous</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1 site in EU</td>
</tr>
</tbody>
</table>

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### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>European Chemicals Bureau</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>EU</td>
</tr>
<tr>
<td></td>
<td>Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
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<tr>
<td></td>
<td>Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>2002</td>
</tr>
<tr>
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<td>N/A</td>
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<td>No Comment.</td>
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<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

**Overall Quality Determination**†

- High: 1.4

---

* MWF = Metric Weighting Factor

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- Medium: ≥ 1.7 to < 2.3
- Low: ≥ 2.3 to ≤ 3.
**Source Citation:** Ecjrc., 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.

**Type of Data Source:** Facility; Completed Exposure or Risk Assessments;

**Hero ID:** 196351

### EXTRACTION Parameter

<table>
<thead>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
</tr>
<tr>
<td>Chemical Concentration:</td>
</tr>
<tr>
<td>Manufacturing, processing, use</td>
</tr>
<tr>
<td>All life cycle stages</td>
</tr>
<tr>
<td>Gives various concentrations for different uses (pg. 37).</td>
</tr>
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</table>

### EVALUATION Domain Metric Rating MWF Score Comments

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>European Chemicals Bureau</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>EU</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>2002</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
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<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**

High 1.4

---

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- **Medium:** $1.7$ to $< 2.3$;
- **Low:** $2.3$ to $\leq 3$.  

---

152
Source Citation: Aca., 2015. Re: TSCA Work Plan Chemical Problem Formulation and Initial Assessment for 1,4-Dioxane.

Type of Data Source: Facility; Reports for Data or Information Other than Exposure or Release Data;

Hero ID: 3809105

### Parameter Data

<table>
<thead>
<tr>
<th>Parameter</th>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, Processing</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacturing, Processing</td>
</tr>
<tr>
<td>Total Annual U.S. Volume (and percent of PV):</td>
<td>1-10 million pounds (2006 CDR)</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1 mfg25-99 Proc</td>
</tr>
<tr>
<td>Chemical Concentration:</td>
<td>&gt;90 percent</td>
</tr>
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</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>2015 PF (US EPA)</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
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<td>Metric 5: Sample Size</td>
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<td>N/A</td>
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</tr>
<tr>
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<td>Metric 6: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Clear documentation of data sources, methods, results and assumptions</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>clear documentation of variability and uncertainty</td>
</tr>
</tbody>
</table>

**Overall Quality Determination**

| Metric 7: Metadata Completeness      | High | 1.0 |

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### Source Citation

### Type of Data Source
Facility: Reports for Data or Information Other than Exposure or Release Data;

### Hero ID
3970246

### EXTRATION

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</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Process Description:</td>
<td>Dehydration and ring closure of diethylene glycol. Concentrated acid used as a catalyst. Continuous process.</td>
</tr>
<tr>
<td>Chemical Concentration:</td>
<td>&gt;90 percent</td>
</tr>
</tbody>
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### EVALUATION

<table>
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<th>Domain</th>
<th>Metric</th>
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<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
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<td>1</td>
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<td>Metric 2: Geographic Scope</td>
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<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
</tr>
<tr>
<td></td>
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<td>2</td>
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</tr>
<tr>
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</tr>
<tr>
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<td>× 1</td>
<td>1</td>
<td>Lists data sources</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Limited discussion of variability and uncertainty</td>
</tr>
</tbody>
</table>

### Overall Quality Determination

| High | 1.1 |

---

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: $\geq 1$ to $< 1.7$; Medium: $\geq 1.7$ to $< 2.3$; Low: $\geq 2.3$ to $\leq 3$. 
**Source Citation:** U.S. E. P. A.. 2017. Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal: 1,4-Dioxane. Facility: Reports for Data or Information Other than Exposure or Release Data; Hero ID 3986663

### EXTRACITION

<table>
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<tbody>
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<td>Life Cycle Stage:</td>
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</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacture, Import</td>
</tr>
<tr>
<td>Process Description:</td>
<td>Conc. Sulfuric acid used as catalyst. Temps from 130 to 200 deg C, pressure from 25-110 kPa. Continuous.</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1 mfg1 import</td>
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### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
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<td>1</td>
<td>EPA Use Dossier</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
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<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
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<td>2</td>
<td>Scenarios within the scope of the risk evaluation</td>
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<td>Metric 4: Temporal Representativeness</td>
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<td>2</td>
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<td>Lists data sources</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Limited discussion of variability and uncertainty</td>
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</table>

**Overall Quality Determination†**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
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</thead>
<tbody>
<tr>
<td>Metadata Completeness</td>
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</table>

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EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacturing, processing, use</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>25 mfg0 import13 proc21 other uses (2015 TRI)</td>
</tr>
<tr>
<td>Chemical Concentration:</td>
<td>Provides table of SDS’s with some conc. Information</td>
</tr>
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</table>

EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
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<td>× 1</td>
<td>1</td>
<td>EPA Use Dossier</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Geographic Scope</td>
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<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
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<td>× 2</td>
<td>2</td>
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<tr>
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<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metadata Completeness</td>
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<td>× 1</td>
<td>2</td>
<td>Limited discussion of variability and uncertainty</td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td>High</td>
<td>1.1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
Source Citation: Ashford, R. D.. 2001. Ashford’s Dictionary of Industrial Chemicals.
Type of Data Source: Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID: 3859379

<table>
<thead>
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<tr>
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<tr>
<td>Life Cycle Stage:</td>
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<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>All life cycle stages</td>
</tr>
</tbody>
</table>

<p>| EVALUATION                                      |                                           |</p>
<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Ashford’s Dictionary of Industrial Chemicals</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>England</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>Just some basic physical properties information. Nothing useful.</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>Low</td>
<td>× 2</td>
<td>6</td>
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</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
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<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
<td></td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
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<tr>
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<td>Unacceptable</td>
<td>4.0</td>
<td>Metric Mean Score: 2.8.</td>
<td></td>
<td></td>
</tr>
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</table>

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics was rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
**EXTRACTION**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacture, Import</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacture, Import</td>
</tr>
<tr>
<td>Total Annual U.S. Volume (and percent of PV):</td>
<td>MFG/import: 1,000+ tonnes (EU)</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
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<td>× 1</td>
<td>1</td>
<td>ECHA</td>
</tr>
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<td>Metric 2: Geographic Scope</td>
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<td>× 1</td>
<td>2</td>
<td>EU</td>
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<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>MFG/import estimate for the EU (1000+ tonnes), other general hazard and use information.</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
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<td>× 2</td>
<td>2</td>
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</tr>
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<td>Metric 6: Metadata Completeness</td>
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<td>No Comment.</td>
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<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
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<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
</tbody>
</table>

**Overall Quality Determination†**

Unacceptable 4.0 Metric Mean Score: 2.2.

**Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.**

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
- High: ≥ 1 to < 1.7;
- Medium: ≥ 1.7 to < 2.3;
- Low: ≥ 2.3 to ≤ 3.
**Source Citation:** OECD Existing Chemical Database. 1999. SIDs initial assessment profile: 1,4-Dioxane.

**Type of Data Source:** Facility; Reports for Data or Information Other than Exposure or Release Data;

**Hero ID:** 3970845

### ExtraCTION

<table>
<thead>
<tr>
<th>Parameter</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacturing, processing, use</td>
</tr>
<tr>
<td>Total Annual U.S. Volume (and percent of PV):</td>
<td>8,000 - 10,000 tons (worldwide production)</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
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<td>Metric 1: Methodology</td>
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<td>× 1</td>
<td>1</td>
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<td>Metric 2: Geographic Scope</td>
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<td>× 1</td>
<td>2</td>
<td>Australia</td>
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<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>Unacceptable</td>
<td>× 2</td>
<td>8</td>
<td>No useful information</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
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<td>× 2</td>
<td>4</td>
<td>1999</td>
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<td>No Comment.</td>
</tr>
<tr>
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<td>Metric 6: Metadata Completeness</td>
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<td>No Comment.</td>
</tr>
<tr>
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<td>Metric 7: Metadata Completeness</td>
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<td>No Comment.</td>
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<tr>
<td><strong>Overall Quality Determination†</strong></td>
<td>Unacceptable</td>
<td></td>
<td></td>
<td>4.0</td>
<td>Metric Mean Score: 2.5.</td>
</tr>
</tbody>
</table>

**** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

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High: \( \geq 1 \) to \( < 1.7 \); Medium: \( \geq 1.7 \) to \( < 2.3 \); Low: \( \geq 2.3 \) to \( \leq 3 \).
Source Citation: The Commission of the European Communities. 2002. Commission recommendation on the results of risk evaluation and the risk reduction strategies for the substances: o-anisidine, 1,4-dioxane.

Type of Data Source: Facility; Reports for Data or Information Other than Exposure or Release Data;

Hero ID: 3970846

### EXTRATION

<table>
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</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
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### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>The Commission of the European Communities</td>
</tr>
<tr>
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<td>Metric 2: Geographic Scope</td>
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<td>× 1</td>
<td>2</td>
<td>EU</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
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<td>× 2</td>
<td>8</td>
<td>Recommendations in response to 2002 EU Risk Assessment</td>
</tr>
<tr>
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<td>Metric 4: Temporal Representativeness</td>
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<td>× 2</td>
<td>4</td>
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</tr>
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</tr>
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<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
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</tbody>
</table>

Overall Quality Determination†

| Unacceptable                 | 4.0 | Metric Mean Score: 2.5. |

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

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- High: $\geq 1$ to $< 1.7$;
- Medium: $\geq 1.7$ to $< 2.3$;
- Low: $\geq 2.3$ to $\leq 3$. 
Source Citation: Franz, C., Bennett, S., DeLeo, P. C., Collatz, M., Kelly, K., Nekoomaram, J., Wieroniey, S. 2015. Comments of the Adhesive and Sealant Council, the American Coatings Association, the American Chemistry Council, the American Cleaning Institute, the Consumer Specialty Products Association, and Waste Management on the 1,4-dioxane problem formulation and initial assessment.

Type of Data Source: Facility; Reports for Data or Information Other than Exposure or Release Data; Hero ID 3986506

EXTRACTION

Parameter | Data
---|---
Life Cycle Stage: | All stages
Life Cycle Description (Subcategory of Use): | All life cycle stages

EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Public Comment from Industry Groups</td>
</tr>
<tr>
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<td>Metric 2: Geographic Scope</td>
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<tr>
<td></td>
<td>Metric 3: Applicability</td>
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<td>× 2</td>
<td>2</td>
<td>General comments on previous problem formulation. No useful information</td>
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<tr>
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<td>No Comment.</td>
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<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
</tbody>
</table>

Overall Quality Determination†

| Unacceptable | 4.0 | Metric Mean Score: 2.0. |

** Consistent with our Application of Systematic Review in TSCARisk Evaluations document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

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† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
Source Citation: MakerBot Industries LLC. 2015. Safety data sheet: PLA 3D printer filament/MakerBot PLA.
Type of Data Source: Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID: 5160198

**EXTRACTION**

<table>
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<tr>
<th>Parameter</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Printing</td>
</tr>
<tr>
<td>Chemical Concentration:</td>
<td>&gt;98 percent chemical that contains dioxane</td>
</tr>
</tbody>
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**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
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<td>Metric 2: Geographic Scope</td>
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</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
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<tr>
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<td>Metric 7: Metadata Completeness</td>
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</tr>
<tr>
<td>Overall Quality Determination†</td>
<td></td>
<td>High</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
### Source Citation

### Type of Data Source Facility; Reports for Data or Information Other than Exposure or Release Data;

### Hero ID 5080531

#### EXTRACITION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Printing</td>
</tr>
<tr>
<td>Process Description:</td>
<td>PCL flakes dissolved in 99.8 percent 1,4-dioxane. Ink samples settled for 24 hrs then stirred at 800rpm. Slides soaked in 2-propanol and dried. 2mL of ink injected in cartridges.</td>
</tr>
<tr>
<td>Chemical Concentration:</td>
<td>99.8 percent, but then mixed with PCL flakes to 5-10 percent PCL</td>
</tr>
</tbody>
</table>

#### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
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<tr>
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<td>Metric 3: Applicability</td>
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<td>3D printing</td>
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</tr>
<tr>
<td>Metric 4: Temporal Representativeness</td>
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<td>1.2</td>
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  High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Type of Data Source Facility:</td>
<td>Reports for Data or Information Other than Exposure or Release Data;</td>
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<td>3538358</td>
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<tr>
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</tr>
<tr>
<td></td>
<td>Life Cycle Description (Subcategory of Use): Printing</td>
</tr>
<tr>
<td></td>
<td>Process Description: PLLA pellets added to dioxane and heated in a silicone oil bath. Condenser prevents dioxane vapors from escaping during heating.</td>
</tr>
<tr>
<td></td>
<td>Chemical Concentration: Pure dioxane mixed with PLLA (0.5 percent, 1 percent, and 1.5 percent w/v)</td>
</tr>
<tr>
<td><strong>EVALUATION</strong></td>
<td><strong>Domain</strong></td>
</tr>
<tr>
<td><strong>Metric</strong></td>
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<td>Applicability</td>
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<td>Temporal Representativeness</td>
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<tr>
<td>Sample Size</td>
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<td>Applicability</td>
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<td>MWF*</td>
<td>1.2</td>
</tr>
</tbody>
</table>

*MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
High: $≥ 1$ to $< 1.7$; Medium: $≥ 1.7$ to $< 2.3$; Low: $≥ 2.3$ to $≤ 3$. 
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Printing</td>
</tr>
<tr>
<td>Process Description:</td>
<td>PCL flakes dissolved in 99.8 percent 1,4-dioxane. Ink samples settled for 24 hrs then stirred at 800rpm. Slides soaked in 2-propanol and dried. 2mL of ink injected in cartridges.</td>
</tr>
<tr>
<td>Chemical Concentration:</td>
<td>99.8 percent dioxane mixed with PCL (5 wt percent)</td>
</tr>
</tbody>
</table>

**EVALUATION**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>Research article</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>UK</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>3D printing</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2016</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
<td>N/A</td>
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<td>No Comment.</td>
</tr>
<tr>
<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
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<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
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<td>N/A</td>
<td>No Comment.</td>
</tr>
<tr>
<td>Overall Quality Determination†</td>
<td></td>
<td>High</td>
<td></td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>

* MWF = Metric Weighting Factor
† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.
Source Citation: Independent Lubricant Manufacturers, Association. 2014. RE: Proposition 65 warning regulation.
Type of Data Source: Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID: 3982411

### EXTRATION

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>MWF</td>
</tr>
<tr>
<td>Chemical Concentration:</td>
<td>&lt;1 ppb</td>
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### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Public Comment from Industry Groups</td>
</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
<td>High</td>
<td>× 1</td>
<td>1</td>
<td>US</td>
</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>MWF</td>
</tr>
<tr>
<td></td>
<td>Metric 4: Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2014</td>
</tr>
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<td></td>
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<td>N/A</td>
<td>No Comment.</td>
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<td>Domain 3: Accessibility/Clarity</td>
<td>Metric 6: Metadata Completeness</td>
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<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
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<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
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<td>N/A</td>
<td>N/A</td>
<td>No Comment.</td>
</tr>
</tbody>
</table>

**Overall Quality Determination**: High 1.2

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:
  - High: ≥ 1 to < 1.7
  - Medium: ≥ 1.7 to < 2.3
  - Low: ≥ 2.3 to ≤ 3.
**Source Citation:** Spin., 2017. SPIN substances in preparations in nordic countries 1,4-dioxane.

**Type of Data Source:** Facility; Reports for Data or Information Other than Exposure or Release Data;

**Hero ID:** 3981126

### Extraction

<table>
<thead>
<tr>
<th>Parameter</th>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing, processing, use</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacturing, processing, use</td>
</tr>
<tr>
<td>Total Annual U.S. Volume (and percent of PV):</td>
<td>PV for different Nordic countries by industry in 2010-2014</td>
</tr>
</tbody>
</table>

### Evaluation

#### Domain 1: Reliability

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Methodology</td>
<td>Medium</td>
<td>× 1</td>
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<td>SPIN</td>
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#### Domain 2: Representative

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographic Scope</td>
<td>Medium</td>
<td>× 1</td>
<td>2</td>
<td>Nordic Countries</td>
</tr>
<tr>
<td>Applicability</td>
<td>Medium</td>
<td>× 2</td>
<td>4</td>
<td>Many industries listed are not in scope</td>
</tr>
<tr>
<td>Temporal Representativeness</td>
<td>High</td>
<td>× 2</td>
<td>2</td>
<td>2010-2014</td>
</tr>
<tr>
<td>Sample Size</td>
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<td>No Comment.</td>
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#### Domain 3: Accessibility/Clarity

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
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</thead>
<tbody>
<tr>
<td>Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
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<td>No Comment.</td>
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</tbody>
</table>

#### Domain 4: Variability and Uncertainty

<table>
<thead>
<tr>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
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</thead>
<tbody>
<tr>
<td>Metadata Completeness</td>
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<td>N/A</td>
<td></td>
<td>No Comment.</td>
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</table>

**Overall Quality Determination\(^\d\)**: Medium 1.7

\(^\star\) MWF = Metric Weighting Factor

\(^\d\) If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:

- **High:** $\geq 1$ to $< 1.7$;
- **Medium:** $\geq 1.7$ to $< 2.3$;
- **Low:** $\geq 2.3$ to $\leq 3$. 

<table>
<thead>
<tr>
<th>Source Citation:</th>
<th>Sapphire, Group. 2007. Voluntary Children’s Chemical Evaluation Program [VCCEP]. Tiers 1, 2, and 3 Pilot Submission For 1,4-Dioxane.</th>
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<tbody>
<tr>
<td>Type of Data Source Facility:</td>
<td>Completed Exposure or Risk Assessments;</td>
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<td>Hero ID</td>
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### EXTRACTION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data</th>
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<tbody>
<tr>
<td>Life Cycle Stage:</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Life Cycle Description (Subcategory of Use):</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Process Description:</td>
<td>3 methods for mfg</td>
</tr>
<tr>
<td>Number of Sites:</td>
<td>1 site in US</td>
</tr>
<tr>
<td>Chemical Concentration:</td>
<td>99.90 percent</td>
</tr>
</tbody>
</table>

### EVALUATION

<table>
<thead>
<tr>
<th>Domain</th>
<th>Metric</th>
<th>Rating</th>
<th>MWF*</th>
<th>Score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1: Reliability</td>
<td>Metric 1: Methodology</td>
<td>Medium</td>
<td>( \times 1 )</td>
<td>2</td>
<td>Ferro Corp submission for VCCEP</td>
</tr>
<tr>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Domain 2: Representative</td>
<td>Metric 2: Geographic Scope</td>
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<td>( \times 1 )</td>
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</tr>
<tr>
<td></td>
<td>Metric 3: Applicability</td>
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<td>( \times 2 )</td>
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<tr>
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<td>Medium</td>
<td>( \times 2 )</td>
<td>4</td>
<td>2007</td>
</tr>
<tr>
<td></td>
<td>Metric 5: Sample Size</td>
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<tr>
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<td>Metric 6: Metadata Completeness</td>
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<tr>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Domain 4: Variability and Uncertainty</td>
<td>Metric 7: Metadata Completeness</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td>No Comment.</td>
</tr>
</tbody>
</table>

**Overall Quality Determination**<sup>†</sup>  
High  
1.4

---

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† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
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  Low: ≥ 2.3 to ≤ 3.